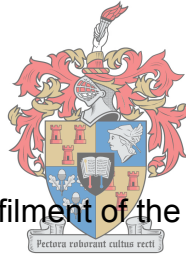


**Perception of the implementation process of a
physiotherapy protocol in a surgical ICU:
The physiotherapists' perspectives**

by

Jacques Johannes Maritz



Thesis presented in partial fulfilment of the requirements for the degree of

Master of Science of Physiotherapy
at Stellenbosch University



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Western Cape

March 2018

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Jacques Johannes Maritz

March 2018

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ABSTRACT

Background

There is a gap at primary and specialty level between best available evidence and clinical practice in all health care disciplines, in both developed and developing countries. The high costs, limited resources and existing evidence of practice variation are a concern in intensive care. Practice variation can be addressed through the development and implementation of evidence-based interventions. Different frameworks, models and theories have been developed to guide the implementation of these interventions. These frameworks emphasise the acquisition of the perceptions and reflections of the target audience to assist in the development and evaluation of the implementation process. The aim of this thesis was to explore the perceptions of intensive care unit (ICU) staff regarding implementation processes of interventions in developing countries, specifically with regard to physiotherapy.

Methods

A scoping review was performed to explore the factors affecting the perception of ICU staff regarding implementation processes of interventions in the ICU setting. Six databases were searched. The results informed the discussion schedule of a qualitative primary study. The primary study aimed to explore and describe the perception of physiotherapists regarding the implementation process of a validated, evidence-based physiotherapy protocol for the management of surgical ICU patients. Participants were recruited using a complete target population sampling method. All participants completed an audio-recorded, individual, semi-structured interview and a follow-up interview. The data was transcribed and thereafter analysed using deductive-inductive content analysis. Credibility and truth-value of the results was ensured through reflexivity, checking of transcriptions, member checking and peer review.

Results

A total of nine papers were included in the scoping review. None of the included studies was conducted in developing countries or were specifically focused on physiotherapy. Through the scoping review, 24 factors affecting the perceptions of ICU staff regarding implementation processes were identified and categorised. Four

categories emerged, namely: 1) intervention; 2) organisation; 3) characteristics of the ICU staff, and 4) implementation strategies. Twelve physiotherapists were recruited to participate in the primary study. Four themes were deductively developed according to the objectives of the primary study. Ten sub-themes emerged from the data analysis. The perception of the physiotherapists regarding the implementation process was influenced by the four categories identified in the scoping review.

Conclusion

There are unique factors affecting the perceptions of staff regarding the implementation of interventions specifically in the ICU setting. Our data confirms the factors that are described by other studies. The unique focus of our study, which included a developing country and a specific profession, namely physiotherapy, did not identify new factors. The intervention being implemented, the structure and culture of the organisation, the characteristics of the individuals involved in the implementation, and the characteristics of the implementation process, all influence the perception of staff regarding implementation processes. An aspect unique to our findings is that the implementation of evidence-based practice is contextual. Change agents who want to implement evidence-based practice in the ICU environment must evaluate and take the individual context into account during the implementation of interventions.

Words: 492

UITTREKSEL

Agtergrond

Daar is 'n gaping op primêre en spesialis vlak tussen die beste beskikbare bewyse en kliniese praktyk in alle gesondheidsorg dissiplines, in beide ontwikkelde en ontwikkelende lande. In die intensiewesorgeenheid (ISE) is die hoë koste van spesialis sorg, die beperkte hulpbronne en gedokumenteerde praktykvariasie kommerwekkend. Praktykvariasie kan aangespreek word deur die ontwikkeling en implementering van bewysgebaseerde intervensies. Verskillende raamwerke, modelle en teorieë is reeds ontwikkel om die implementering van hierdie intervensies te rig. Hierdie raamwerke beklemtoon dat die verkryging van die gebruikers se persepsies en refleksies belangrik is om die ontwikkeling en evaluering van implementeringsprosesse te fasiliteer. Die doel van hierdie tesis was om die persepsies van ISE personeel met betrekking tot die implementeringsprosesse van intervensies in ontwikkelende lande te verken, met spesifieke fokus op fisioterapie.

Metodes

'n Literatuuroorsig is uitgevoer om die faktore wat die persepsie van ISE personeel met betrekking tot die implementeringsprosesse van intervensies in die ISE beïnvloed, te verken. Ses databasisse is deursoek. Die resultate is gebruik om 'n besprekingskediule vir 'n kwalitatiewe primêre studie te rig. Die doel van die primêre studie was om die persepsie van fisioterapeute met betrekking tot die implementeringsproses van 'n bewysgesteunde fisioterapieprotokol vir die hantering van chirurgiese ISE pasiënte te verken en te beskryf. Deelnemers is gewerf met behulp van 'n volledige teikenpopulasie steekproefmetode. Alle deelnemers het 'n stem-opgeneemde, individuele, semi-gestruktureerde onderhoud en opvolgonderhoud voltooi. Die data is getranskribeer en deduktiewe-induktiewe inhoudsanalise is gebruik om die data te analiseer. Geloofwaardigheid en waarheidswaarde van die resultate is deur refleksie, nagaan van transkripsies, lidkontrolering en portuuroorsig verseker.

Resultate

Nege artikels is ingesluit in die literatuuroorsig. Geen van die insluitende studies is uitgevoer in ontwikkelende lande of is spesifiek gefokus op fisioterapie nie. Die literatuuroorsig het 24 faktore geïdentifiseer wat die persepsies van ISE personeel met betrekking tot implementeringsprosesse beïnvloed. Hierdie 24 faktore is in vier kategorieë gekategoriseer, naamlik: 1) intervensie; 2) organisasie; 3) eienskappe van die ISE personeel en 4) implementeringstrategieë. Twaalf fisioterapeute is gewerf vir deelname in die primêre studie. Vier temas is deduktief ontwikkel volgens die primêre studie se doelwitte. Tien subtemas het na vore gekom uit die data-analise. Die persepsie van die fisioterapeute met betrekking tot die implementeringsproses is beïnvloed deur die vier kategorieë wat in die literatuuroorsig geïdentifiseer is.

Gevolgtrekking

Daar is unieke faktore wat die persepsie van personeel met betrekking tot die implementeringsprosesse van intervensies in die ISE beïnvloed. Ons data bevestig die faktore wat deur ander studies beskryf word. Die unieke fokus van ons studie, wat 'n ontwikkelende land en die fisioterapie professie ingesluit het, het nie nuwe faktore geïdentifiseer nie. Die geïmplementeerde intervensie, die struktuur en kultuur van die organisasie, die eienskappe van die individue wat betrokke is by die implementering en die eienskappe van die implementeringsproses, beïnvloed die persepsie van die personeel met betrekking tot implementeringsprosesse. Uniek tot ons bevindinge is dat die implementering van bewysgesteunde praktyk kontekstueel is. Veranderingsagente wat bewysgesteunde praktyk wil implementeer in die ISE omgewing moet die individuele konteks evalueer en in ag neem tydens die implementering van intervensies.

Woorde: 500

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LIST OF ABBREVIATIONS

CFIR:	Consolidated Framework for Implementation Research
ICU:	Intensive care unit
PI:	Primary investigator
SICU:	Surgical intensive care unit
US:	United States
WWWH model:	What, Where, Who, How model

GLOSSARY

Champions: Individuals who are internal to the organisation and unsolicited advocates for the intervention (1)

Change agent: A key role player facilitating individuals and groups to understand the processes they have to go through to change aspects of their attitudes or behaviour to themselves, their work or other individuals (2)

Contextual factors: The set of circumstances or unique factors that surround a particular context (3)

Dissemination: The spreading of knowledge (4)

Evidence-based practice: The integration of the best available research evidence with clinical expertise and patient values and preferences to improve outcomes for individuals, groups, communities and systems (5)

Guideline: A rule or instruction indicating the correct way of a proceeding (6)

Implementation process: The deliberate engineering of change to alter actions in social systems and represent the activities that may be needed for the change to occur (4)

Implementation science: The scientific study of methods, interventions, strategies and variables that influence the uptake of evidence-based health care practices (7)

Intervention: The adoption of any technique or research by the organisation to improve consumer needs or decrease costs and variations (4,8,9)

Opinion leaders: Individuals who have the ability to informally influence the opinions, attitudes, or behaviours of others with relative frequency (10)

Perception: “The way you think about or understand someone or something, the ability to understand or notice something easily, the way that you notice or understand something using one of your senses” (11)

Protocol: An official plan of a proceeding (12)

Target audience: Individuals for whom the intervention is intended or individuals whose awareness of the intervention is required (13)

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND AND STUDY CONTEXT

Health personnel frequently fail to adhere to best evidence-based practices, resulting in practice variations and decreased quality of care. (14,15) The high costs, limited resources and existing evidence of practice variation are concerns in the intensive care unit (ICU). (14,16) A study estimated that if five commonly accepted evidence-based interventions were consistently adhered to in the ICU, 167,819 lives of critically ill patients could be saved per year in the United States (US). (17) Initiatives to improve quality of care and reduce costs are of major importance. (16) The most common strategies to improve uniformity of best evidence-based practice delivery are the development and implementation of intensive care standardised protocols, (16) clinical practice guidelines, and evidence-based pathways. (18) The development and availability however, of these interventions do not necessarily lead to changes in clinical practice. (19,20) A review (21) reported it takes an estimated average of 17 years for research evidence to reach clinical practice.

The focus of management and research in this area has started to shift from the development to the implementation of interventions. (20,22) The implementation of interventions into practice is a complex, multifaceted process. (23,24) The field of implementation science has arisen to assist with the uptake of evidence-based practice into practice. (25) Implementation science is a relatively new research field with the first studies tracing back to 1976. (26) Pronovost et al. (17) noted that 99% of the US medical research budget is dedicated to the understanding of diseases and the development of appropriate therapies, while 1% is dedicated to the implementation of such therapies. This is an improvement from the 0.25% that was available in 1977. (27)

The factors affecting adherence to best evidence-based practices, according to numerous studies, including studies conducted in ICUs, are knowledge, attitudes and behaviours. (28-30) It is therefore safe to assume that factors affecting attitudes, knowledge and behaviours will influence adherence to interventions. However, studies indicate that despite having the appropriate knowledge and attitudes towards interventions, long-term adherence remained inconsistent. (4,31-34) The challenge

seems to be to change the behaviour of the target audience towards adherence of interventions. (31,35) Barriers presented by the patient, intervention, implementation, organisation and environment, all influence behaviour, causing behavioural change to be an intricate process. (29,36,37) The Cochrane Effective Practice and Organisation of Care identified over 300 systematic reviews of professional behaviour change strategies. However, the evidence regarding the possible effectiveness of different strategies to overcome specific barriers facing adherence, remains incomplete. (34)

Multiple different frameworks, models and theories have been developed to guide the implementation of interventions. (24) Multidimensional frameworks have been developed to consolidate the theories, models and frameworks. (3,38,39) Frameworks have suggested acquiring knowledge regarding the perceptions and reflections of the target audience to assist in the development and evaluation of the implementation. (3,38,39) It is argued that, if interventions are to be successfully implemented, the needs and preferences of the target audience must first be understood. (19) The implementation must be accompanied by strategies that will influence the perceptions of the target audience to encourage uptake. (31,40) Perception is a process that occurs when individuals organise and interpret their sensory impressions to be able to give meaning to their environment. (41) The behaviour of individuals is based on what they perceive as being real, which is not necessarily the objective reality. (41) Perception is influenced by the individual's personal characteristics, which include attitudes, personality, motives, interests, previous experiences as well as expectations. (41)

Reflection is one way of gaining access to perceptions. (42) By means of reflection, the otherwise unknown perception of the target audience towards an implementation process, can be understood. The intention of reflection is to deliberately examine what took place, the intended purpose thereof and identification of difficulties that arose so as to incorporate the gathered information into future improvements or recommendations. (43-45) Evidence from a variety of settings suggests that reflection involves conscious detachment from the activity followed by a distinct period of contemplation. (44)

Although perceptions of hospital clinicians have been investigated in other countries, (46-48) no comparable study has been carried out in South Africa, and no one, as far

as the primary researcher is aware of, has specifically explored the perceptions of physiotherapists regarding the implementation process of a physiotherapy protocol in an intensive care setting. This served as the primary motivation for this thesis. The thesis forms part of a larger project – “The implementation and evaluation of a validated evidence-based physiotherapy protocol in a surgical ICU: A controlled before and after experimental trial” (Ethics Approval Number: S13/09/170). The larger project consists of three phases. Phase 3 aims to evaluate the implementation process of a validated, evidence-based physiotherapy protocol for the management of surgical ICU patients and to determine the effect thereof. The physiotherapy protocol consists of five algorithms. (49-51) The algorithms were developed to address practice variation and facilitate evidence-based clinical decision-making of physiotherapists. (52) The use of evidence-based treatments and protocols may contribute to improved quality of care given by physiotherapists. (52) While the protocol adherence will be measured objectively in the larger project, this thesis will provide a deeper understanding of the objective data collected regarding protocol adherence. The findings can contribute to the knowledge of implementation science by improving the understanding of how target audiences experience implementation processes.

The thesis had two aims. Firstly, to explore and describe the factors affecting the perceptions of ICU staff regarding implementation processes of interventions in the ICU setting. The second aim of the thesis was to explore and describe the perception of physiotherapists regarding the implementation process of a validated evidence-based physiotherapy protocol for the management of surgical ICU patients.

1.2 THESIS OVERVIEW

The thesis consists of four chapters and is written in article format (Figure 1.1). Chapter 2 and Chapter 3 are formulated according to the BioMed Central submission guidelines for the Implementation Science journal for a short report (Addendum L) and a research article (Addendum M) respectively. The findings from the scoping review (Chapter 2) informed the development of a discussion schedule to achieve the second aim of the thesis through a primary study (Chapter 3). The search strategy and findings of the scoping review will be updated prior to submission to the journal for publication. To ease reading, one reference list is presented for the thesis.

Individual reference lists will be prepared for each article with submission for publication.

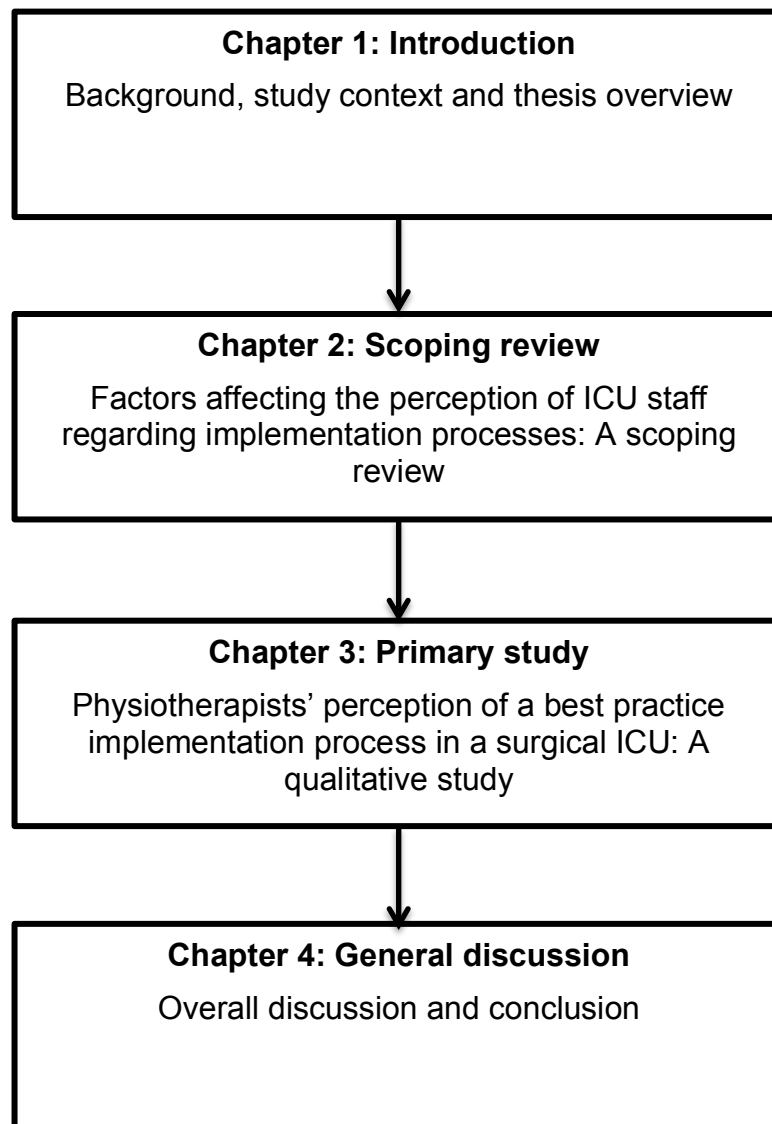


Figure 1.1: Thesis overview flow diagramme

CHAPTER 2: SCOPING REVIEW

FACTORS AFFECTING THE PERCEPTION OF ICU STAFF REGARDING IMPLEMENTATION PROCESSES: A SCOPING REVIEW

2.1 BACKGROUND

The gap between best available evidence and clinical practice is one of the most consistent findings in health services research. (32,53) The evidence-practice gap is evident in all health care disciplines, in primary and specialist care and in both developed and developing countries. (54,55) Garland (15) has reported the failure of health care staff to adhere to best evidence-based practice as the single most important deficiency in health care today. Results of studies conducted in developed countries suggest that at least 30-40% of patients do not receive recommended care, and an estimate of 20-25% of care is unnecessary or potentially harmful. (32,55-57) Strategies to reduce the evidence-practice gap have recently received more research attention. (34)

Many strategies claim to facilitate the change of current practices to evidence-based practices, however insufficient evidence exists to conclude which strategies are the most effective in specific settings or circumstances. (58) The synthesis and implementation of research evidence e.g. guidelines or protocols; appear to be one of the most promising and effective strategies for changing practice. (55) However, the development of these interventions can be expensive and are often not adhered to after dissemination. (55) Existing evidence indicates that a structured implementation process can improve adherence to interventions, but generally the strategies used during the implementation frequently only produce moderate change in practice. (32) Strategies should rather be purposefully chosen or developed to target the barriers facing implementation in the setting. (20,32,55,58) Analysis of the barriers affecting intervention implementation and adherence is therefore recommended prior to selection of implementation strategies. (20,32,55,58)

A literature review of health care professionals' perceptions on participation in quality improvement activities, found that many of the barriers health care staff identified

arise from problems related to the effective collaboration between and across health professions. (59) Multidisciplinary collaborative care is central in the complex and dynamic environments of intensive care units (ICUs). (35,60) Other special features of ICUs that pose barriers to intervention implementation and adherence include reliance on technological support and rapidly changing complex critical illnesses. (35) The unique environment of ICUs makes the transfer of knowledge into practice uniquely challenging and implementation processes to improve practice variation in other clinical areas may not necessarily lead to the desired result in ICUs. (35)

Implementation processes in health care is the deliberate engineering of change to alter actions in social systems and represents the activities that may be needed for successful research uptake in clinical settings. (4) Evaluation of the outcomes forms part of implementation processes in order to assess implementation effectiveness and sustainability. (3,4) Numerous frameworks have been developed to guide implementation processes. (24) Damschroder et al. (3) reported that many of these frameworks overlap, yet each are missing important constructs included in other frameworks. The Consolidated Framework for Implementation Research (CFIR) was therefore developed. The CFIR is a pragmatic meta-theoretical framework synthesised from 19 previously developed frameworks to guide the formative evaluation of implementation processes. (3) The framework is composed of five major domains and each domain comprises a number of constructs. These domains interact to affect implementation success. (3) Evaluation of most of the constructs relies on the perceptions of the individuals who are affected by the implementation processes. (3) The perceptions of the individuals who are involved in implementation processes are commonly used to determine the factors affecting implementation processes. (26,39)

To our knowledge no review exists regarding the factors affecting implementation processes in the ICU. Durlak and DuPre (26) have synthesised the findings of 81 studies conducted in various environments to determine the factors affecting implementation. Five categories of factors were developed, which largely overlapped with the five major domains of the CFIR. The 81 studies included in Durlak and DuPre (26) were related to youth prevention programmes and typically occurred in non-health settings. However, Durlak and DuPre (26) reported that their findings

overlapped substantially with the findings of three other systematic narrative reviews (22,61,62) of which only one focused primarily, but not exclusively, on research studies in health care. (62) This suggests that there could be particular factors that are relevant to all implementation processes despite the scope of the implementations.

It is unclear what research has been done in the critical care environment regarding the factors affecting ICU implementation processes and whether these factors are similar to or different to the factors affecting implementation processes synthesised by Durlak and DuPre. (26) A scoping review was undertaken to explore the factors affecting the perceptions of ICU staff regarding implementation processes of interventions in the ICU setting to identify current gaps in this body of literature. The information obtained in this review could inform whether gaps in this body of literature exist. The objectives of the scoping review were to describe the factors affecting the perceptions of ICU staff regarding implementation processes, the geographical distribution and year of publication of the literature, the study settings used, the professions of the participants, the research evidence and implementation processes that were implemented as well as the methods and time points of data collection and the data analysis methods utilised.

2.2 METHODS

A scoping review was conducted and guided by the framework published by Arksey and O'Malley (63) to rapidly map current research activity in the research field of ICU staff's perceptions of implementation processes.

2.2.1 Search strategy

Six electronic bibliographic databases, namely CINAHL, MEDLINE, Science Direct, Scopus, PubMed and Web of Science were searched from database inception to 10 June 2016. Search terms and limits were applied. Each database had a different set of search terms and limits. A detailed search strategy is available in Addendum A.

2.2.2 Article review

The primary investigator (PI) and a secondary reviewer (FK) independently and systematically screened all papers returned by the search strategy for relevance to

the review, at title, abstract and full-text level. In the event of disagreements, a discussion to reach consensus was arranged between the two reviewers. If consensus could not be reached, a third reviewer (SH) was consulted. Full-text papers were retrieved by accessing electronic journals, manually searching journals or by contacting the authors.

Studies exploring and describing the perceptions of ICU staff regarding implementation processes of interventions in the ICU setting were included in the review. The inclusion and exclusion criteria (Table 2.1) were created post hoc and applied to the publications to retrieve the most relevant papers for inclusion into this scoping review (Figure 2.1).

Table 2.1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> • ICU or critical care staff • ICU implementation process • Human studies • Perception or perspective of the implementation process • Primary studies • Reviews 	<ul style="list-style-type: none"> • Non-English papers • Primary health care • Perceptions or perspectives of staff not in ICU • Research protocols

The PI extracted and charted relevant data from the included papers in a customised spreadsheet. The data extracted and charted included country of study in which the study was conducted; year of publication; ICU setting; profession of participants; type of interventions implemented; description of the implementation process; method of data collection; data collection time points; and method of data analysis.

Factors that affected the perceptions of ICU staff with regards to implementation processes were extracted from the results sections of the included papers. Only papers reporting the qualitative data analysis methods used in their respective studies were included. As many of the included papers were qualitative in design, we argue that papers with a clear data analysis method will add credibility to our results.

2.3 RESULTS

The total number of search hits from the selected databases included 862 papers. Duplicate papers were eliminated, and 375 papers remained (Addendum B). Following the selection process (Figure 2.1), nine papers were included. (64-72)

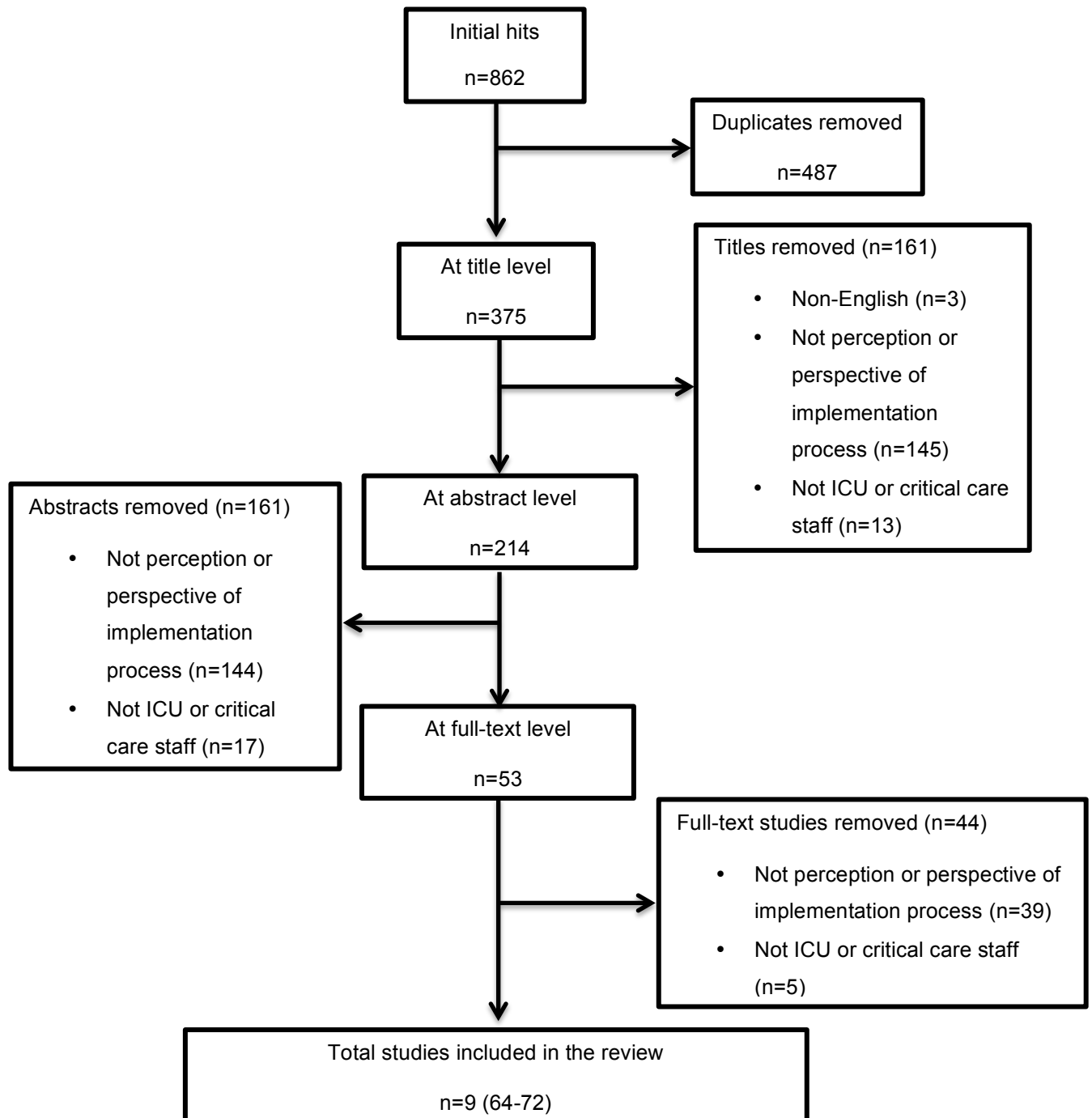


Figure 2.1: Selection process flow diagramme

2.3.1 Description of included papers

2.3.1.1 Geographical distribution

All studies were conducted in developed countries from two continents (Figure 2.2). Most studies (n=7) were conducted in North America. Four studies were conducted in the United States of America, (66,69,71,72) three in Canada, (64,67,68) one in England (65) and one in the Netherlands. (70) None of the included studies were conducted in Africa, Asia, Australia or South America.



Figure 2.2: Countries in which included studies were conducted

2.3.1.2 Year of publication

The first papers describing the perceptions of ICU staff regarding implementation processes were published in 2004 (Figure 2.3). Since then there have been regular publications with at least one paper published per annum over the last three years.

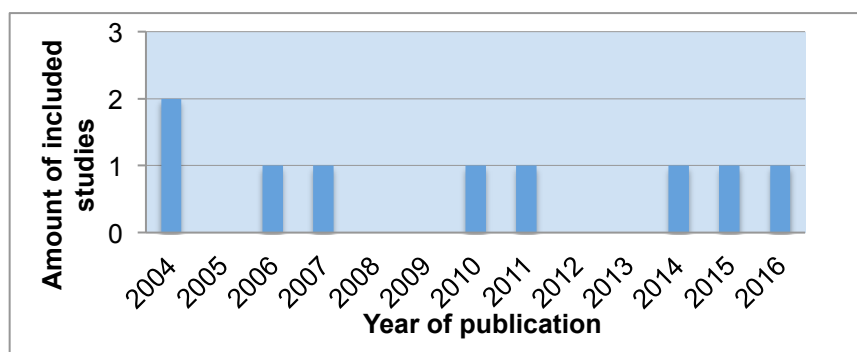


Figure 2.3: Year of publication of the studies

2.3.1.3 Study settings and professions of study participants

Studies were conducted in various types and number of ICUs (Table 2.2). The majority of papers (n=5) used one ICU as the study setting. Perceptions of multiple health professionals were explored in each paper (Table 2.2). This highlights the multidisciplinary involvement of staff with the implementation of interventions in the ICU. All papers included nursing staff as study participants. Four studies (n=44%) included allied health professionals, which included dietitians, physiotherapists, occupational therapists, speech and language pathologists, respiratory therapists, rehabilitation psychologists and physician assistants. (67-69,71) Respiratory therapists were the most common allied health professionals to be included.

Table 2.2: Study settings and professions of study participants

Authors	Type of ICUs						Professions of study participants					
	NR	SICU	MICU	PICU	NICU	Mixed SICU/MICU	RN	MD	AH	Mx	Tech	Other
Cahill et al. (68)						✓ n=4	✓	✓	✓ DT	✓		
Chen et al. (67)				✓ n=1			✓	✓	✓ RT		✓	✓ RPh
Eakin et al. (71)			✓ n=1				✓	✓	✓ RT, PA, PT, OT, SLP, RP	✓	✓	✓ CPC
Hogan and Logan (64)					✓ n=1		✓	✓				
Kemper et al. (70)	✓ n=3						✓	✓		✓		
Locke et al. (72)						✓ n=1	✓	✓				
Mayer et al. (69)		✓ n=1		✓ n=1			✓	✓	✓ RT			
Popernack (66)		✓ n=1	✓ n=1	✓ n=1	✓ n=1		✓			✓		
Sutton et al. (65)	✓ n=1						✓				✓	✓ HCA

✓ = Yes; NR = Not reported; n = Number of ICUs; SICU = Surgical intensive care unit; MICU = Medical intensive care unit; PICU = Paediatric intensive care unit; NICU = Neonatal intensive care unit; RN = Registered nurses; MD = Medical doctors; AH = Allied health professionals; Mx = Management; Tech = Technicians; DT = Dietitians; RT = Respiratory therapists; PA = Physician assistants; CPC = Clinical programme coordinators; PT = Physiotherapists; OT = Occupational therapists; SLP = Speech and language pathologists; RP = Rehabilitation psychologists; RPh = Registered pharmacists; HCA = Health care assistants

2.3.1.4 Implementation processes

A variety of implementation processes were described in the included papers (Table 2.3). We have structured implementation processes into 1) the framework guiding the process, 2) the format of the interventions and 3) the implementation strategies. In three papers (n=33%), (68,70,71) the description of the implementation process was referred to in earlier publications. (73-75) The details regarding the implementation processes were therefore extracted from the earlier publications. Four papers (n=44%) reported a framework guiding the implementation processes. (64,69,71,72) The format in which the interventions were introduced to the target audience was either in guidelines (n=11%), (68) programmes (n=22%), (65,71) tools (n=22%), (64,72) or systems (n=44%). (66,67,69,70) Four papers (n=44%), (67-70) implemented existing evidence-based interventions and five papers (n=56%), (64-66,71,72) adapted evidence-based interventions for use in the study setting. The majority of papers (n=78%) identified a change team or opinion leaders to assist in the uptake of the interventions. (64,66,68-72) Six papers (n=67%), (64,65,68-71) reported baseline assessments prior to training of which half of these papers (n=33%), (64,70,71) performed barrier assessments. All papers used multiple implementation strategies and included active dissemination strategies to train the staff. Six papers (n=67%), (64,66,68,70-72) included passive dissemination strategies.

Table 2.3: Implementation processes

Authors	Framework guiding implementation process	Intervention format	Implementation strategies			
			Change team/ opinion leader identification	Pre-training baseline assessment	Active dissemination strategies	Passive dissemination strategies
Cahill et al. (68)		Guideline*	✓	✓ Strategies dissemination assessment	✓	✓
Chen et al. (67)		System*			✓	
Eakin et al. (71)	✓ Knowledge translation model (76)	Programme†	✓	✓ Barrier assessment	✓	✓
Hogan and Logan (64)	✓ Ottawa Model of Research Use (77)	Tool†	✓	✓ Barrier assessment	✓	✓
Kemper et al. (70)		System*	✓	✓ Barrier assessment	✓	✓
Locke et al. (72)	✓ Iowa Model of Evidence-Based Practice to Promote Quality Care (78)	Tool†	✓		✓	✓
Mayer et al. (69)	✓ Team training success factors (79), TeamSTEPPS Implementation Guide (80)	System*	✓	✓ Baseline assessment of outcome objectives	✓	
Poperna ck (66)		System†	✓		✓	✓
Sutton et al. (65)		Programme†		✓ Content assessment of intervention	✓	

✓ = Yes; * Existing evidence-based intervention; † Adapted evidence-based intervention

2.3.1.5 Methods and time points of data collection

Interviews and surveys were used as data collection methods in the included papers (Table 2.4). The majority of papers (n=67%) used a semi-structured format. Four papers (68,69,71,72) (n=44%) collected data through interviews, three papers (65,67,70) (33%) used surveys and two papers (22%) (64,66) used both methods.

Four papers (44%) collected baseline data prior implementation (64,65,69,70). Perceptions of ICU staff regarding implementation processes were collected during and after the implementation processes, not prior (Table 2.4). All the studies collected data post implementation. Six papers (64,65,67-69,72) did not report the time points post implementation when perceptions were explored.

Table 2.4: Methods and time points of data collection

Authors	Methods		Time points	
	Interviews	Surveys	During implementation	Post implementation
Cahill et al. (68)	✓ Semi-structured			✓ Unspecified
Chen et al. (67)		✓ Unstructured [*]		✓ Unspecified
Eakin et al. (71)	✓ Semi-structured			✓ Several years
Hogan and Logan (64)	✓ Unspecified	✓ Semi-structured [†]	✓ After each transport	✓ Unspecified
Kemper et al. (70)		✓ Structured ^ψ		✓ 3 months
Locke et al. (72)	✓ Unstructured			✓ Unspecified
Mayer et al. (69)	✓ Semi-structured			✓ Unspecified
Popernack (66)	✓ Unspecified	✓ Semi-structured ^φ		✓ 1 year
Sutton et al. (65)		✓ Semi-structured ^Ω		✓ Unspecified

✓= Yes; ^{*} Self-developed survey; [†] Self-developed survey based on the Ottawa Model of Research Use;

^ψ Questionnaires based on existing implementation, team training and crew resource management evaluation concepts and categorised in the levels of health care proposed by Grol and Wensing (53); ^φ

Survey used not considered a tool of scientific rigor; ^Ω Questionnaire designed based on the findings of previous studies and the recommendations identified through the evidence-based literature review.

Unspecified = No additional information was reported

2.3.1.6 Data analysis methods

Various qualitative and quantitative analysis methods were used in the included papers (Table 2.5). The majority of papers (n=78%) used qualitative data analysis methods. However, three papers (65,66,72) were not specific to the qualitative data analysis methods that were used.

Two studies (n=22%) (64,66) used both qualitative and quantitative analysis methods and were specific to the quantitative analysis methods used, but not the qualitative analysis methods. Mayer et al. (69) did not provide full reporting and analysis of the interviews in the publication. Data from Cahill et al. (68) was analysed deductively using the knowledge–attitude–behaviour framework developed by Cabana et al. (81)

Table 2.5: Data analysis methods

Authors	Qualitative analysis methods				Quantitative analysis methods		
	Not reported	Inductive	Deductive	Thematic analysis	Data tabulation	Descriptive Analysis	Analysis of variance and regression analysis
Cahill et al. (68)			✓*				
Chen et al. (67)		✓					
Eakin et al. (71)				✓			
Hogan and Logan (64)	✓					✓ Mean and standard deviation	
Kemper et al. (70)					✓ Frequency and percent distributions		✓
Locke et al. (72)	✓						
Mayer et al. (69)		✓	✓				
Popernack (66)	✓				✓ Percent distributions		
Sutton et al. (65)					✓ Frequency and percent distributions		

✓=Yes; * Knowledge-attitude-behaviour framework (81)

2.3.1.7 Factors affecting the perceptions of ICU staff regarding implementation processes in the ICU

Locke et al., (72) the qualitative results of Hogan and Logan, (64) and Popernack (66) were not reviewed for the factors affecting the perceptions of ICU staff regarding

implementation processes due to the papers not specifying the data analysis methods. The results of six papers (65,67-71) in their entirety and the quantitative results from Hogan and Logan (64) and Popernack (66) were reviewed.

As a result of this review, 24 factors were identified that affected the perceptions of ICU staff regarding implementation processes. To facilitate understanding we decided to categorise the factors. Four categories emerged namely: 1) intervention; 2) organisation; 3) characteristics of the ICU staff; and 4) implementation strategies (Tables 2.6 -2.9).

2.3.1.7.1 Intervention

Factors that related to the intervention that was implemented (Table 2.6) were extracted from three papers. (65,70,71) ICU staff perceived the implementation process more positively if the content of the intervention was realistic (70) and based on current available evidence. (71) In addition, the degree within which the intervention was flexible to fit into the existing work processes, and the involvement of the target audience in the development of the intervention positively affected ICU staff's perception regarding the implementation process.

Table 2.6: Intervention factors

Authors	Factors		
	Content	Fits with other work processes	Target audience involvement in development
Cahill et al. (68)			
Chen et al. (67)			
Eakin et al. (71)	✓	✓	
Hogan and Logan (64)			
Kemper et al. (70)	✓	✓	✓
Mayer et al. (69)			
Popernack (66)			
Sutton et al. (65)	✓		

✓ = Identified as a factor in paper

2.3.1.7.2 Organisation

The organisational factors influencing the perception of ICU staff regarding implementation processes were divided into resources and culture (Table 2.7).

Resources were further divided into time, capital resources, financial resources and human resources. Several aspects of time were extracted including, the time commitment of developers and change agents to develop and implement strategies, (68) the time the target audience spend on the intervention, (70) the availability of the entire ICU team to attend training sessions. (68) The availability and accessibility to equipment to promote the use of the intervention is listed under capital resources. (68,71) The number of potential users of the intervention (71) and the involvement of a change team (68,70,71) is listed under human resources. A change team may include opinion leaders (68,71) and champions. (71)

The social interactions and work climate of the target audience is described under culture. The support of the implementation process by the management was commonly reported and affects the perception of staff positively regarding implementation processes in the ICU. A culture of buy-in influences the perception of the staff in believing the intervention is beneficial (70,71). Good cooperation and communication between different team members (71) and the inclusion of multiple disciplines or the entire team in the implementation process positively affects the perception of ICU regarding the implementation. (68-71)

Table 2.7: Organisational factors

Authors	Factors								
	Resources					Culture			
	Time	Capital resources Equipment	Financial resources Funding	Human resources Users Change team		Support	Buy in	Multi-disciplinary engagement	Team communication
Cahill et al. (68)	✓	✓		✓	✓	✓		✓	
Chen et al. (67)									
Eakin et al. (71)		✓	✓		✓	✓	✓	✓	✓
Hogan and Logan (64)									
Kemper et al. (70)	✓				✓	✓	✓	✓	
Mayer et al. (69)								✓	
Popernack (66)									
Sutton et al. (65)						✓			

✓= Identified as a factor in paper

2.3.1.7.3 Characteristics of the ICU staff

The characteristics of the ICU staff relates to the factors imbedded in the individual potential user (Table 2.8). Being convinced of the benefits of the implementation process or the intervention (65,67,69,70) positively affects the perceptions of staff regarding the implementation process. The degree of ease for the user to slip back into previous routines (70) and the extent to which ICU staff feel confident that the target audience will be competent to use the intervention after the implementation process, affect the ICU staff's perception of the implementation process. (65) In order to elicit valid perceptions, staff need to be aware or form part of the implementation process. (65)

Table 2.8: Characteristics of the ICU staff

Authors	Factors					
	Perceived benefits of the implementation process	Perceived benefits of the intervention	Degree of ease to slip back into previous routines	Forgotten training	Perceived competency of target audience	Awareness of the intervention and implementation process
Cahill et al. (68)						
Chen et al. (67)	✓ Familiarisation and evaluation of the intervention					
Eakin et al. (71)						
Hogan and Logan (64)						
Kemper et al. (70)		✓	✓	✓		
Mayer et al. (69)		✓				
Popernack (66)						
Sutton et al. (65)	✓ Convinced of the benefits of the intervention				✓	✓

✓= Identified as a factor in paper

2.3.1.7.4 Implementation strategies

The number and type of implementation strategies used has an impact on the perception of ICU staff (Table 2.9). (64,65,68,71) Multiple different, tailored strategies that are team-centred and cover the theoretical knowledge base and practical skills of the intervention, positively affect the perception of staff regarding

implementation processes. (65,68,71) The strategies include reminders, academic detailing (e.g. one-on-one education), educational sessions, audit and feedback, and e-mail/web-based tools. (64,68,71) Hogan and Logan (64) used a 10-point Likert scale to measure the degree of influence each implementation strategy had in changing the target audience's practice. In-service training, one-on-one interviews and tools to aid the use of the intervention were found to be most influential.

Cahill et al. (68) reported that poor attendance of meetings regarding the implementation process negatively affect staff's perceptions of the implementation process. Popernack (66) and Sutton et al. (65) reported on ICU staff's perceived adequacy after educational training during the implementation process was received. Participants from Popernack (66) reported that more practical training was needed closer to the implementation date and that the educational session was too lengthy and should rather have been multiple sessions.

Table 2.9: Implementation strategy-related factors

Authors	Factors					
	Number of strategies	Type of strategies	Attendance of training sessions	Perceived adequacy of training	Time of strategies	Duration of training sessions
Cahill et al. (68)	✓	✓	✓			
Chen et al. (67)						
Eakin et al. (71)		✓				
Hogan and Logan (64)	✓	✓				
Kemper et al. (70)						
Mayer et al. (69)						
Popernack (66)				✓	✓	✓
Sutton et al. (65)		✓		✓		

✓= Identified as a factor in paper

2.4 DISCUSSION

Through the scoping review, 24 factors affecting the perceptions of ICU staff regarding implementation processes were identified and categorised. Four categories emerged namely 1) intervention; 2) organisation; 3) characteristics of the ICU staff and 4) implementation strategies. These categories align with the domains and constructs of the CFIR and the categories of Durlak and DuPre. (3,26) The

majority of factors affecting the perceptions of ICU staff regarding implementation processes overlapped with the factors affecting implementation as reported by Durlak and DuPre, (26) despite the studies being conducted in different research settings and with different populations. However, some factors affecting the perceptions of ICU staff regarding implementation are unique, as they have not been reported specifically in Durlak and DuPre's synthesis (26) or in the CFIR. (3)

This review highlights the unique factors, which include 1) time; 2) a multidisciplinary engagement; 3) the perceived benefits of the implementation process; and 4) the number and type of implementation strategies. Several aspects of time affect the perceptions of ICU staff regarding implementation processes. This includes time commitment of developers and change agents to develop and implement strategies; the time the target audience spends on the interventions, and the availability of the entire ICU team to attend training sessions. Time constraints are one of the most important barriers to the implementation of quality indicators in Dutch ICUs. (82) This is understandable, especially when acknowledging that critical ill patients demand a higher nursing workload. (83) Barriers preventing ICU staff from being educated on interventions being implemented included ICU workload, the severity of patient illnesses and complexity of the interventions. (29) Dedicated education time is therefore recommended. (29)

Due to the multidisciplinary environment of the ICU, the degree of engagement and buy-in from all relevant health professions into the implementation process, affects staff perceptions. It has been suggested that for the successful implementation of multidisciplinary interventions in the ICU all members involved should have a shared understanding of the goals of the intervention. (84) Target audiences' perceived benefits of interventions are known factors affecting implementation processes. (26) Target audiences' perceived benefits of implementation processes have however not received the same attention. The perceived benefits of the implementation process affecting perceptions included familiarisation with the intervention and becoming convinced of the benefits of the research intervention. Noticeably the perceived benefits of the implementation processes were all regarding the interventions. The number and type of implementation strategies that are used during training affect staff's perceptions. Various tailored strategies are recommended as they positively affect the perceptions of ICU staff. From the literature it was evident that multi-

faceted strategies, tailored to overcome the barriers facing practice change are required for successful implementation and that there is no single strategy that is deemed superior. (20,85-87)

All studies included in this review were conducted in developed countries. The findings of this review highlight the key role organisations play in the perceptions of staff regarding implementation processes. Moving forward it will be important to also include staff perceptions in resource-constrained environments. We hypothesise that more and different factors affecting perceptions will be reported if similar studies are conducted in resource-constrained environments. Results from these studies could improve the understanding of the barriers that ICU staff face with implementation processes in order to address them sufficiently.

The perceptions of nurses and medical doctors are commonly explored regarding ICU implementation processes. Limited papers have specifically reported on the perceptions of allied health professionals working within the ICU regarding implementation processes. Allied health professionals are not always working in ICU and may face additional barriers when implementing ICU interventions. Due to the possible additional barriers allied health professionals may face, the ICU's multidisciplinary environment and because perceptions between health care professions differ in the ICU, (88) we identify the perceptions of allied health professionals working within the ICU regarding implementation processes as a field for further exploration.

Our findings, however, must be interpreted with caution. Only papers published in English were included in this review. The qualitative results of three papers (64,66,72) were excluded from being reviewed for factors affecting perceptions, due to methodological shortcomings. We encourage future papers to use clear and dense descriptions of the methodology to ensure trustworthiness of the results. Although we searched systematically and thoroughly for publications on factors affecting the perceptions of ICU staff regarding the implementation processes in the ICU setting, this field of research is not well indexed. As contributing factors, 29 terms have been identified that are used to refer to some aspect of the evidence to practice process. (4) The terminology in implementation science is still evolving and clear definitions for concepts are still required.

2.5 CONCLUSION

The intervention being implemented, organisational structure, personal characteristics of the target audience and the strategies used during implementation, all affect the perceptions of staff regarding implementation processes. When planning the implementation of new interventions in ICU, researchers and change agents should consider these factors. Attention to the availability of time, multidisciplinary engagement, the perceived benefits of the implementation process and the number and type of strategies that are used during training, must be given when implementing interventions especially in the ICU. Going forward, it will be necessary to also investigate ICU staff's perceptions of implementation processes in resource-constrained environments.

CHAPTER 3: PRIMARY STUDY

PHYSIOTHERAPISTS' PERCEPTION OF A BEST PRACTICE IMPLEMENTATION PROCESS IN A SURGICAL ICU: A QUALITATIVE STUDY

3.1 BACKGROUND

The synthesis and implementation of research evidence through clinical practice guidelines and protocols are considered to reduce practice variation and bridge the gap between best available evidence and clinical practice. (55,89) Multiple frameworks have been developed to guide the implementation processes of these interventions. (24) However, in reality over two-thirds of all projects implementing change are deemed to fail (90) and non-adherence to interventions is common. (20) This poor success rate may suggest a possible absence of valid frameworks for implementing and managing the conversion of current practices to evidence-based practices. (91) To our knowledge, no framework currently exists that has been developed specifically for the implementation of guidelines and protocols in the intensive care unit (ICU), despite the reported special features of ICUs, which pose unique barriers to intervention implementation and adherence. (35)

Both the American College of Critical Care Medicine and the European Society of Intensive Care Medicine regard physiotherapy as a basic requirement for patient management in intensive care. (92,93) While physiotherapy interventions applied in the ICU have sufficient evidence, (94,95) the variety of physiotherapy practices observed between countries, regions and individual units, is a concern. (87,96) Practice variation in other ICU disciplines is concurrent with sub-optimal patient outcomes and increased cost. (97) The development and implementation of best available evidence-based protocols are encouraged to address this variation. (98)

The main factors affecting physicians' adherence to interventions are knowledge, attitudes and behaviours. (81) Similar findings were recognised in the ICU environment for other health disciplines. (28,29,68) Even though knowledge and appropriate attitudes are necessary, they alone are insufficient for adherence to interventions. Favourable behaviour may still be required due to barriers presented

by the patient, intervention, implementation, or organisational factors. (29,36,37) A pragmatic meta-theoretical framework for the formative evaluation of implementation, the Consolidated Framework for Implementation Research (CFIR), supports these findings. (3) Relevant aspects of the framework as well as knowledge, attitude and behaviour must therefore be addressed when reflecting on the implementation process of an intervention.

To ensure that the implementation of interventions is effective and sustainable, adherence is imperative. A recent paper (99) highlighted that further information regarding the factors that influence the adherence of the target audience to interventions is required. The understanding of the perceptions that clinical users have towards the implementation process of the intervention can be valuable to identify factors influencing adherence to interventions. (19) This can be done through the assessment of barriers and formative (subjective) evaluation of the implementation process. Multiple studies have investigated the perceptions of ICU health personnel after the implementation of interventions. (64-72) However, to our knowledge, none have investigated the perceptions of physiotherapists after the implementation of a new ICU physiotherapy protocol especially in a resource-constrained environment.

The aim of this study is to describe the perception of physiotherapists regarding the implementation process guided by a pragmatic meta-theoretical framework (3) of a protocol which is deemed safe, viable and based on current evidence for physiotherapy in surgical ICUs. (49-51,96) The study had four objectives. The objectives were to explore and describe the perception of the physiotherapists regarding 1) the nominal group technique that was used to tailor the implementation strategies; 2) the implementation strategies used in the implementation process; 3) how the physiotherapists perceived the real-world implementation of the protocol; and 4) what the factors were affecting their protocol adherence. This information could add to the understanding of how to reduce practice variation and bridge the gap between best available evidence and clinical practice.

3.2 MATERIALS AND METHODS

3.2.1 Study design

A descriptive and interpretive qualitative design using semi-structured interviews was chosen to gain in-depth insights about the physiotherapists' perceptions and experiences of the implementation process. (100)

3.2.2 Research context and setting

This study forms part of a larger project, namely: "The implementation and evaluation of a validated evidence-based physiotherapy protocol in a surgical ICU: A controlled before and after experimental trial" (Ethics Approval Number: S13/09/170). The larger project consists of three phases. Phase 3 aims to evaluate the implementation process of a validated, evidence-based physiotherapy protocol for the management of surgical ICU patients. (52,101)

A validated evidence-based physiotherapy protocol for the management of surgical ICU patients (49,52,96,101) was implemented in a level one, 14-bed surgical ICU at a tertiary training institution in the Western Cape. (102) It is the responsibility of one physiotherapist to ensure that the unit is provided with physiotherapy service during the week from 7:30 am to 4 pm. There are different physiotherapists on call every evening that may attend to patients in the surgical ICU. The weekend policy stipulates that weekend physiotherapy will be provided to four patients who are referred by the doctor on call. Final year physiotherapy students from two Western Cape universities also make use of the unit for clinical rotations. (102)

Through a nominal group technique, the physiotherapists involved in the implementation process, tailored the best practice educational implementation strategies to best fit their needs and organisational structure. The tailored educational implementation strategies included a paper and electronic educational handbook (protocol and relevant published evidence), workshop series (interactive sessions on the algorithms and their application using patient scenarios of patients that had been admitted to the surgical ICU during the study period), and grand rounds (bedside discussions regarding application of the algorithms to selected patients in the ICU). Reminders, which included pocket cards of the algorithms for

each physiotherapist and posters of the algorithms that was put up in the ICU and physiotherapy department, were also used in the implementation process.

Best practice, within the implementation science, dictates the development of a tailor-made implementation programme, (86) to ensure that there is adherence. The controlled before and after experimental trial evaluates objectively whether the implementation process that the physiotherapists agreed to, resulted in effective practice change. This study describes the perception of physiotherapists regarding the implementation process of the protocol and presents a formative (subjective) evaluation of the process.

3.2.3 Population

All physiotherapists employed at the time of data collection (August to September 2016) at the tertiary institution, who were involved in the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients, were eligible for the study. The educational implementation strategies were completed on 11 February 2016, which allowed time for the physiotherapists to reflect on the process and implement the protocol as required.

3.2.4 Sampling methods

Participants were recruited using a complete target population sampling method. The target population consisted out of 17 potential participants. Marshall et al. (103) suggests a sample size of fifteen to thirty participants for single case studies. Due to the small size of the study population, attempts were made to recruit all members from the population. (104) However, data saturation will ultimately determine the final sample size required. (103)

3.2.5 Ethical considerations

Ethics approval was obtained from the Health Research and Ethical Committee at the Health Sciences Faculty of Stellenbosch University (S16/05/091) (Addendum C). The institution granted approval and provided a venue where the research was conducted (Addendum D).

Participation was completely voluntary, and all participants provided written consent prior to data collection. The targeted physiotherapists were informed and assured

that their involvement and contribution would be kept anonymous. The primary investigator (PI) was neither involved in the protocol design nor implementation process.

3.2.6 Recruitment method

Multiple meetings were scheduled with the physiotherapy department at the institution to give all potential participants opportunity to attend an introductory meeting. The physiotherapists were informed that they were only eligible to participate in the study if they were involved in the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients.

During the meetings the study was explained, and each attendee received a copy of the participant information leaflet and consent form (Addendum E) and attendees were requested to complete an attendance register (Addendum F) at each meeting. Attendees received a participation acceptance sheet (Addendum G) to indicate whether they would like to participate in the study or not. Attendees who indicated their willingness to participate were contacted telephonically, from information provided in the participation acceptance sheets, to arrange an appointment for an interview. Furthermore, notices (Addendum H) with copies of the participant information leaflet and consent form were placed on the noticeboards in the physiotherapy department inviting any further potential participants to the study. All documents were made available in Afrikaans and English.

3.2.7 Data collection and management

The PI conducted 12, individual, semi-structured interviews with a mean length of 40 minutes using a discussion schedule (Addendum I). The discussion schedule was guided by the findings of a scoping review (Chapter 2). The PI conducted 12 follow up, individual, semi-structured interviews with a mean length of 48 minutes to ensure clarity on statements made in the previous interviews. All the interviews were audio-recorded, which allowed for the data to be transcribed and analysed.

The discussion schedule was piloted prior to data collection to ensure relevancy. Pilot testing consisted of conducting individual interviews with two physiotherapists who participated in the implementation process, but were not any longer enrolled at

the institution. The interview responses from the pilot participants were not included in the study sample, but provided the PI with an opportunity to review and revise the discussion schedule.

3.2.8 Data analysis

The data was analysed using deductive-inductive content analysis. The data was themed according to the objectives of the study. The data related to each objective of the study were thereafter analysed using inductive interpretive content analysis for emerging codes, categories and sub-themes. (104,105) The datasets generated and analysed during the current study are not publicly available due to participant privacy that could be compromised, but are available from the corresponding author on reasonable request.

3.2.9 Quality criteria

All audio recordings of the interviews were transcribed verbatim. The PI ensured credibility and truth-value of the data by using summarising and clarification techniques as validity checks throughout the interviews and comparing the transcriptions with the interview recordings. Follow-up interviews were conducted to ensure that the PI made limited assumptions during data analysis. The PI immersed himself completely in the data analysis, to understand the information in its entirety. Following the data collection and analysis process, all study participants were invited telephonically to participate in member checking. Member checking entitled the participants to review the analysed data to safeguard its credibility and trustworthiness. Incentives for member checking were provided and five participants (42%) participated.

Providing detailed descriptions of the study context and methodology ensured transferability and dependability of the results. Peer review of the study process, the transcripts and analysis of the interviews by a third party established credibility, dependability, auditability and confirmability. The PI kept a field diary during the data collection process. The diary was used to reflect on the study process, document research decisions and bias identification. Research bias was recognised and declared. An additional function of the field diary was to document any attentive impressions of the interviewees and summarisation of the main points of each interview. Dependability and credibility were further safeguarded through

triangulation of the collected data, namely, the recorded interviews, the transcriptions and the PI's field journal.

3.3 RESULTS

Thirteen (76%) of the target population physiotherapists attended the introductory meetings. Twelve physiotherapists indicated their willingness to participate and were included in the study.

The median age of the participants was 34 years and the median general experience of the participants was nine years. The diversity among participants regarding each selected characteristic is demonstrated in Table 3.1.

Table 3.1: Participant characteristics

Characteristics	n
Age (years)	
24-30	3
31-35	5
36-40	3
>40	1
Qualification	
BSc Physiotherapy	11
MSc Physiotherapy	1
Year BSc Physiotherapy qualification obtained	
Before 2000	1
2000-2005	4
2006- 2010	5
After 2010	2
General clinical experience (years)	
2-5	3
6-10	4
>10	5
Public practice clinical experience (years)	
2-5	3
6-10	4
>10	5
ICU clinical experience (years)	
2-5	5
6-10	3
>10	4
Specific interest in ICU clinical practice	
Y	9
N	3

n = Number of participants; Y = Yes; N = No

3.3.1 Themes and sub-themes

Ten sub-themes emerged from the data. Verbatim quotes have been used to support the results. The sub-themes are discussed under their respective themes. All non-English quotes used in the results have been translated into English (Addendum J).

3.3.1.1 The nominal group technique

Three sub-themes emerged from the data, which reflected the perception of the physiotherapists regarding the tailoring of the implementation strategies. These included 1) understanding of the nominal group technique, 2) experience of the nominal group technique and 3) behaviour of participants.

3.3.1.1.1 Understanding of the nominal group technique: *“... if we just understood better...”*

Not all participants understood the purpose of the nominal group technique and perceived that the change agent should have made the purpose of the activity clearer to them. During the nominal group technique, some participants were unaware that the activity would determine the implementation strategies used in the implementation process of the protocol in their setting. Not all participants took their needs and organisational structure into consideration when they voted what strategies should be implemented.

PT7 (p.29): *... we did not know we really had to go do it... I think if we just understood better and understood that we should choose something that fits our current schedule, then, maybe then it would have been a little bit better.*

There was not complete agreement from all the participants regarding the implementation strategies used in the implementation process of the protocol.

PT9 (p.11): *... the three that were chosen were not the three for which I actually voted... I was forced to use it to work for me.*

3.3.1.1.2 Experience of the nominal group technique: *“... it also makes us feel more appreciated, more part of it...”*

Various perceptions regarding the nominal group technique were reported. The activity was either experienced as enjoyable or tedious. Furthermore, some participants felt appreciated and empowered by the activity, because their input was

valued. Participants were satisfied that the voting during the activity was anonymous to avoid external influences.

PT3 (p.24): *Yes, and it also makes us feel more appreciated, more part of it, that we are not just there to implement your research.*

PT4 (p.4): *I feel there was a lot of repetition. Then things took a little longer. And if you still have work then it always feels a bit [giggles] longer if you're pushed for time.*

3.3.1.1.3 Behaviour of participants: *“[The change agent] got the buy-in from us by giving us the responsibility...”*

The nominal group technique affected participants' buy-in towards the implementation process. Participants were more likely to buy-in when they felt empowered and in agreement with the results of the activity. It must also be noted that some participants that agreed initially with the implementation strategies were no longer in agreement at the point when the strategies were implemented.

PT3 (p.24): *[The change agent] got the buy-in from us by giving us the responsibility to choosing what way we wanted this to be done.*

PT11 (p.61): *... when it came to that point of having to have it delivered they just decided well they didn't want to do it like this anymore.*

3.3.1.2 The implementation strategies

Attendance of and participation in implementation strategies and application of strategies are the two sub-themes that emerged.

3.3.1.2.1 Attendance of and participation in implementation strategies: *“... if I know that something is going to benefit me... I want to participate...”*

The personal context of participants, aspects of the implementation strategies, the change agent and the organisational structure and culture affected the attendance and participation of participants to the implementation strategies.

Personal context included the buy-in of participants to the implementation process, the degree of overlap between participants' practice and the protocol, areas of interest in physiotherapy and the participants' perceived benefits of the protocol, the

implementation process and the research project. Participants perceived that participation in the implementation strategies could have been better if they were more aware of the benefits prior to the application of the strategies.

PT7 (p.62): *... before we could continue to understand the algorithm... [The change agent] must have 100% buy-in.*

PT6 (p.39): *You always think that they are going to teach you something new in the workshop but um, it was nothing new... I just got verification that I am still up to date... with the treatment happening in ICU...*

PT11 (p.53): *... if [the change agent] out right said in the beginning, these are going to be the benefits you are going to be getting from this implementation of the study... if I know that something is going to benefit me... I want to participate...*

The implementation strategies consisted of several educational sessions. The aspects of the implementation strategies that affected the participation of participants included the number of sessions, duration of sessions, date and time of sessions, timing between sessions, number of participants allowed per session and degree of interaction or group work.

PT13 (p.8): *It should have been closer together, because I feel if workshops are grouped closer together you still can remember what was discussed in the last workshop...*

Punctuality and time management of the change agent during the educational sessions affected the attendance and participation of participants. Changing of educational sessions without consultation with the staff, negatively affected participants' willingness to attend and their perception regarding the aim of the educational sessions. The change agent's motivation and encouragement during the implementation strategies affected participation.

PT6 (p.38): *It gives you a negative feeling towards the research, because then it is not really aimed at informing us, because if [the change agent] change a date and... don't take care to find out from people is this still going to be a suitable time [the change agent] may end up coming here and many people can't attend...*

PT11 (p.62): ... *I think if [the change agent] had to really just encourage us and really be there to motivate then I think maybe attitudes would have been a bit different... I think then we would've been a lot more participative and encouraging...*

The organisational structure that affected the attendance and participation of participants included their area of work and workload. A non-participative culture to research studies exists in the physiotherapy department mainly due to two reasons. Firstly, research studies are perceived by the staff as additional workload and secondly participants feel unappreciated by the university, which is where they perceive the research study originated from.

PT6 (p.41): ... *it really wasn't of that much importance to them to be attending and to receive this information as they wouldn't spend a lot of time implementing it or hardly get a chance to implement it in the ICU.*

PT13 (p.9): ... *not everyone could attend, cause of the workload we have.*

PT11 (p.56): ... *there's not very much of a participative culture when it comes to research and study and doing these things and assisting people outside of your own area... because they just don't want to do, give anything extra of themselves, they feel they are doing enough...*

PT7 (p.23): ... *we have absolutely no relationship with the university staff... Some of them don't even know your name [laughs]... And now the university comes, and they put another extra task on you.*

3.3.1.2.2 Application of strategies: "I really enjoyed having that combination..."

The implementation of multiple strategies, rather than a single strategy was well received. The layout of the posters and reminders, the presentation of the workshops and the environment where the implementation strategies were executed, all affected the learning abilities of the participants.

PT14 (p.4): *I really enjoyed having that combination of the information sessions and the paper patient and then the application at the bedside on that day in that environment...*

PT8 (p.8): ... *with the cards? I just get confused with them [laughs]... Arrows going there... So, I never really take any cards with.*

PT7 (p.31): ... *it is an intensive care, so the atmosphere is a bit different. So, it's not an ideal learning atmosphere.*

The grand round, the practical bedside teaching of the protocol was mostly perceived as having limited benefit. Participants expected the grand rounds to be more practical in nature and include real life demonstrations. There was a need to observe what to do when faced with practical challenges that prevented adherence to the protocol.

PT12 (p.35): ... *it also solidified the new theory that we had been taught so it's, in my mind it is no use teaching you something and then don't apply it later on and [the change agent] by doing the grand round showed us that it doesn't only work within paper patients, but actually in real life situation it does affect the patient.*

PT3 (p.44): *I would have liked [the change agent] to go through, because I think that in the complicated patients where... the techniques or what the algorithm says you should be doing is contraindicated or the patients are not stable enough for them, then what do we offer those patients?*

Additional strategies that participants perceived should have been implemented, included one-on-one sessions with the change agent and the identification of opinion leaders and champions. The inclusion of other surgical intensive care unit (SICU) staff to improve multidisciplinary engagement when implementing the protocol was recommended by participants.

PT7 (p.7): ... *if [the change agent] is gone, then there was not someone else there who half motivated and kept that optimism and excitement there... there were no key role players.*

PT4 (p.21): *But I think it would also be good if one could get the whole team into it, because we often have trouble with the nurses that they do not want to mobilise... mobilisation is not necessary-, necessarily a physiotherapy thing. Anyone can do it... But that everyone has half fully bought into the idea...*

3.3.1.3 The real-world implementation of the protocol

The real-world effect following the implementation of the protocol is discussed under two sub-themes namely, the effect on the physiotherapists and the effect on the organisation.

3.3.1.3.1 The effect on the physiotherapists: “... my thinking has changed.”

The implementation process of the protocol has had an impact on the participants' decision-making and practice of physiotherapy. Following the implementation process, mobilisation as a treatment technique was perceived as more valuable. Participants are mobilising patients earlier and are using less, but higher, functional and more patient-specific treatment techniques compared to before the implementation process.

PT3 (p.40): *Um, well I will push more to mobilise patients on day one... Because it enhances their recovery.*

PT12 (p.49): *I do specific techniques instead of all techniques as what we were taught previously per se...*

PT13 (p.32): *... this protocol actually did me a favour, because I did a lot less, you know of like the manual techniques and all of that, I rather mobilise, and my patients got better quicker, so I mean my thinking has changed.*

By attending and participating in the implementation process and adhering to an evidence-based protocol, participants gained more confidence and independence in their ICU treatment decisions. The protocol brought about a level of independency in the practice of participants by evaluating what is the best possible treatments for patients instead of mindlessly following the instructions of doctors. However, some participants were not regularly in the SICU environment and reportedly experienced no personal change.

PT7 (p.71): *... just knowing that you have that evidence base algorithm, it gives you the confidence that if someone is going to ask me now but why, you can tell that one that it has been proven, it's evidence proven. So, I'm not just working with experience, I'm not just working with opinion.*

PT3 (p.25): *I didn't really work much in the surgical ICU. So, it didn't really affect my implementation that much.*

3.3.1.3.2 The effect on the organisation: “... from my point of view, everything is the same...”

The perceptions regarding the effect of the implementation of the protocol varied between participants. Some participants were unsure, others perceived no change

and some perceived changes. Reported changes included, SICU staff being more aware of the protocol and that there is an improved multidisciplinary approach in the SICU.

PT9 (p.24): *For me, what I can see from my point of view, everything is the same...*

PT12 (p.23): *I am aware of the fact that people are a lot more aware of the fact that there is a protocol that does exist in the surgical ICU...*

PT7 (p.72): *Yes definitely. I feel it is more a multidisciplinary approach.*

3.3.1.4 The factors affecting protocol adherence

Three sub-themes emerged from the data regarding the perceived factors affecting the adherence of the physiotherapists to the protocol. The sub-themes included: 1) perceptions of the protocol, 2) resistance to change, and 3) the organisation.

3.3.1.4.1 Perception of the protocol: “I take it as a guide...”

Participants’ perceptions of the protocol, whether it was perceived as a guide, recipe or tick list affected their anticipated and experienced benefits and drawbacks of the protocol. The perceived benefits and drawbacks of the protocol affected participants’ attitude and adherence towards the protocol.

PT12 (p.13): *I take it as a guide... because I understand that this is ideal patients in an ideal world with ideal circumstances but unfortunately we don’t have that ideals here...*

PT8 (p.5): *... it’s sort of like the tick list ...I cannot always say that I am following the protocol, I haven’t tick everything on the list yet...*

PT10 (p.10): *... some of the older, more experienced [physiotherapists] are not, (pause) they feel that maybe they are, are given a recipe and, and, and the algorithm is preventing them from being somebody independent and free to do whatever they need to do...*

3.3.1.4.2 Resistance to change: “People don’t like change especially here...”

Resistance to change practices affected adherence to the protocol. This resistance was due to their perceived mistrust in the clinical benefits of the protocol and their perception of the change agent.

Participants’ perception of the quality of the evidence of the protocol, their inability to observe the clinical benefits of the protocol and their years of clinical experience resulted in the perceived mistrust in the clinical benefits of the protocol.

PT12 (p.40): *Um, I think it’s just how we were taught and...I mean I’ve been a [physiotherapist] for a long time now and we were always taught you know be effective and doing a bit of introspection for me repositioning of a patient is not effective enough...*

PT11 (p.58): *People don’t like change especially here... You know most people have been working for quite a long time and they feel... it is their right to do certain things the way they want to do it...*

PT6 (p.19): *I do not have a lot of patients where I could implement and see the effects of it and then evaluate for myself if it is worthwhile doing it that way rather than the other way.*

The perceived degree of communication between the change agent and participants, whether the change agent is enrolled at the institution or not and the perceived motives of the change agent affected participants’ perception of the change agent.

PT5 (p.33): *... if I already have an attitude towards [the change agent] then I’m going to say to myself I’m not going to apply it, why must I...*

PT7 (p.39): *I want to change and [the change agent] have to show me what the benefit will be for me, in my career, and in my personal and social life, if I am going to change.*

PT5 (p.32): *It feels like someone comes from outside in our daily work... and comes saying, here is my, my thesis... I want to implement it, do it... So, a bit forced, just do it...*

3.3.1.4.3 The organisation: “... is a case of wrong time, wrong place...”

The participants perceived that both the organisation of the physiotherapy department and the SICU affected their adherence to the protocol. Factors related to the physiotherapy department that affected protocol adherence included, the weekend policy, shortage of physiotherapists, workload of participants, lack of support from the management, limited treatment time and participants being allocated to a particular area.

PT12 (p.23): *We are short staffed... So, it's more difficult to apply the research protocol... because we have limited resources.*

PT9 (p.19): *... is a case of wrong time, wrong place. Truly, in the ideal world with the ideal ICU and the ideal team, it will work perfectly.*

PT7 (p.49): *So, at the end of the day, is it probably important that the manage-, management is on board... I did not get the impression that there was any level of enforcement from, from, from management to follow the protocol...*

In the SICU it was perceived that limited resources, regular turnover of all health disciplines, unavailability of nursing staff to assist with mobilisation, a lack of team approach and the communication between SICU team members affected protocol adherence.

PT9 (p.53): *... extension lines maybe or more IVACs or drip stands that can move together with you. The drip stands of us are stuck in the bed, so it cannot get loose. Um, maybe like a rollator... There's nothing like that...*

PT3 (p.47): *Well, I don't know how well the rotating doctors were made aware of the protocol... we check with the doctors if they agree with your treatment plan... if the doctor had merely understood the algorithm better or understood the benefit of it then you might have, wouldn't have that discrepancy...*

PT10 (p.48): *... a lot of the things in the ICU, we can't always do alone. You sometimes need somebody's assistance um, and I kind of got the idea that nursing said: well, this is a [physiotherapy] thing, there you go, do it on your own...*

Participants perceived that a team approach was necessary for the protocol to be sustainable in the SICU. All health disciplines involved in the SICU should manage

and adhere to the protocol. This would encourage a culture of adherence to the protocol, because staff would be in agreement with treatments, have shared responsibilities and mutual goals.

PT13 (p.17): *I feel that... a lot of people still need to um, like doctors, nurses all the other parts of health needs to be included on this for it to be sustainable and like to be effective and efficient in the ICU itself...*

3.4 DISCUSSION

Participants expressed a range of perceptions regarding the implementation process and factors affecting their adherence to the protocol. All perceptions were influenced by one of four subjects, namely: 1) the individual; 2) the organisation; 3) the protocol, and 4) the implementation process. The four subjects confirm the CFIR framework (3). Our findings are supported by multiple reviews, including reviews outside the scope of health care. (22,26,61,62) Similar to Damschroder et al. (3) and Durlak and DuPre, (26) we found that the factors related to the four subjects interact with one another to affect the perception of the participants; however, this interaction was not measured. The inclusion of quantitative methodology and a tool to measure this interaction is recommended. No additional or different subjects were identified in this study compared to similar studies conducted in ICUs in developed countries or with different health disciplines. (64-72)

The nominal group technique is a consensus method for problem solving, idea-generation, or determining priorities. (106) Consensus is defined as a process where final decisions are made by agreement. (107) This means all involved parties agree with the final decision and are willing to carry out the decision. (107) From the data it is clear that there was not complete agreement from all participants regarding the implementation strategies used in the implementation process of the protocol. Our results suggest if the target audience reach consensus regarding the educational strategies used in the implementation process their buy-in towards the process might improve.

Resistance to change was evident and has been described in other health care studies. (108,109) A possible reason for the resistance against new practice is due to habits. Habits are automatic responses to contextual factors, acquired through repeating a similar action in the presence of these factors. (109) It has been

suggested that clinical practice is to an extent habitual in nature and to effectively change practice not only does the target audience have to learn new practices, but also unlearn relevant habits. (109,110)

The change agent plays a significant role in affecting the perceptions of the participants regarding the implementation processes and the factors affecting their adherence towards interventions. The CFIR supports this finding. (3) A recent study reported on the importance of effective communication between change agents and teachers regarding the implementation process in school-based interventions. (111) Our findings indicate that the choice of change agent and effective communication between the change agent and target audience may be vital for the effectiveness of the implementation process in health care interventions. Evidence indicates that when the targeted professionals are directly and actively participating in the development phase of an intervention the likelihood of successful implementation is increased. (36,85) The results of this study suggest the involvement of the target audience in the development of the implementation process may also be beneficial.

Little literature has reported on the factors affecting the attendance and participation of the target audience to implementation strategies. However, a study exploring the factors influencing attendance in a structured physical activity programme, (112) found similar results to us. The study also reported the benefits of the programme, the participants' other obligations, the atmosphere of classes and logistics such as inconvenient venue or class times affected attendance. (112) The factors affecting the attendance and participation of the target audience to implementation strategies might be a field for further investigation.

It is suggested that implementation processes of physiotherapy interventions in multidisciplinary environments should include staff from other disciplines if their assistance or their agreement with the interventions is required. This finding is supported by two other studies that found similar results in the ICU for other health disciplines interventions. (84,113)

This study highlights the value of subjectively evaluating implementation processes by using target audiences' reflections of implementation processes and the factors affecting their adherence to interventions. Despite using a pragmatic meta-theoretical framework (3) to guide the implementation of the protocol and tailoring

the training strategies, multiple barriers hampering adherence to the protocol were still reported by the target audience during the subjective evaluation of the implementation process. Current research suggests that the success of any implementation depends on the consideration of the barriers facing practice change and the use of tailored strategies to overcome these barriers. (20) The method to perform barrier assessments has, however, not been well described in the literature. Further research is necessary to find the gold standard approach in performing barrier assessments. Our findings suggest the perceived barriers affecting adherence will be related to the four subjects discussed above, which can be used to guide barrier assessments.

3.5 LIMITATIONS

The study findings cannot be generalised to all ICU settings due to the qualitative methodology of the study, however multiple studies confirmed the results of the study.

The PI was known to the target population, which may have affected the data collected from the participants; to what extent is however unknown.

PT11 (p.17): *So knowing [the change agent] makes a difference like knowing you, makes a difference as well.*

Some participants were aware of the intervention. The intervention was previously implemented and evaluated in the research setting and could have affected the perceptions of the participants. (52,96,101)

PT14 (p.2): *I obviously have been aware of the algorithms... The research have been available for a long time.*

All participants were invited to participate in a member checking session and 42% participated. It is unknown to what extent the additional participants (58%) would have affected the study results.

3.6 CONCLUSION

This is the first study to describe the perception of physiotherapists regarding the implementation of an ICU intervention in a developing country. No new factors that

affect the perceptions of staff regarding implementation processes of ICU interventions were reported in this study compared to studies conducted in developed countries. The individual, organisation, intervention and implementation processes need to be considered when following a process of implementation of evidence into practice. The change agent plays a significant role in the implementation process as they affect participant perceptions of the process. Implementation processes of physiotherapy interventions in multidisciplinary environments should include staff from other disciplines if their assistance or agreement with the interventions is warranted.

Subjective evaluation of implementation processes is important. Despite using a framework to guide the implementation of a physiotherapy protocol and tailoring the educational implementation strategies, multiple barriers hampering adherence to the protocol were still reported by the target audience. Implementation science should aim to develop a gold standard approach in performing barrier assessments to grant change agents with the best possible opportunity to identify the barriers prior the implementation of interventions.

CHAPTER 4: GENERAL DISCUSSION

4.1 CONTRIBUTIONS TO KNOWLEDGE AND CLINICAL RELEVANCE

The thesis had two aims. The first was to explore and describe the factors affecting the perception of intensive care unit (ICU) staff regarding the implementation processes of interventions in the ICU setting. The second aim was to explore and describe the perception of physiotherapists regarding the implementation process of a validated evidence-based physiotherapy protocol for the management of surgical ICU patients.

The scoping review highlighted that a limited number of studies have explored the perceptions of staff regarding ICU implementation processes in resource-constrained environments. Moreover, few papers have reported specifically on the perceptions of allied health professionals working within the ICU, regarding implementation processes. Contrary to our thinking, the results of the scoping review and primary study suggest that additional insight for the advancement of implementation science would not be gained by repeating these studies in other constrained environments or with other health disciplines.

We argue this because despite diversity in scope, programmes and populations, the scoping review, primary study and multiple other studies (20,22,26,29,61,62) have similarly found that the perception of target audiences regarding implementation processes are influenced by the following four subjects, namely: 1) the intervention; 2) the organisation; 3) the individual and 4) the implementation process. The primary study found that the factors related to the four subjects interact with one another to affect perception and adherence. The Consolidated Framework for Implementation Research (CFIR) (3) and Durlak and DuPre (26) confirmed this finding. Durlak and DuPre (26) stated that a multi-level ecological framework for understanding implementation is necessary and should consider the interaction between the factors. We developed the What, Where, Who, How (WWWH) model (Figure 4.1) to add to the research knowledge.

The model conceptualises the interdependency between the four subjects to influence the perception of the implementation processes and adherence to interventions. “What” represents the intervention that is being implemented and

factors related to the intervention. “Where” represents the factors related to the organisation and where the intervention is implemented. “Where” includes the resources, structure and culture of the organisation. The factors surrounding the target audience and change agents are represented by “Who”. The “How” of the model represents the factors related to the type of implementation strategies and the manner in which the implementation strategies are performed.

The scoping review further emphasised that the factors that affect perception of staff regarding implementation processes differ between implementations and contexts, although all the factors are influenced by the four subjects discussed above (Tables 2.6-2.9). A recent paper supports this finding. (114) Frameworks recommend change agents to evaluate the contexts of the implementations through barrier assessments, and to tailor interventions and implementation processes to the needs of the target audiences. (4,76,115) The thesis highlighted the value of evaluating implementations by means of the target audience’s reflections.

The scoping review found that the implementations of interventions in the ICU are unique, especially due to the multidisciplinary engagement of staff. This was confirmed by the primary study. Furthermore, the primary study found that it is important to acknowledge that allied health interventions might need the approval and support from other disciplines to be sustained in the ICU. It is therefore necessary to evaluate whether disciplines, other than the intended discipline need to be involved in the implementation processes of ICU interventions. Objective measurements of the target audience’s self-efficacy, degree of team interaction and satisfaction with interventions and implementation processes may be beneficial to ensure appropriate adaptations to implementation processes for most effective outcomes.

Many implementation efforts to change practice are short lived and long-term sustainability is problematic. (116) Additional research is necessary to explore and understand under which conditions interventions are sustained. (116) The primary study found that staff perception of the intervention and its benefits, the change agent and the organisation affect adherence to interventions. The primary study also found that the involvement of the target audience in the implementation process increases their buy-in. Literature recommends that the target audience be involved in the development of the intervention and that multifaceted implementation strategies

are used and not only educational strategies. (36,85,87) We suggest ICU implementation processes be an iterative, internally driven process by local opinion leaders and champions from all involved disciplines to facilitate long-term sustainability and to limit barriers.

To improve the quality of health care, best available research evidence should be implemented. However, current implementation processes are inconsistent in sustaining the adherence of target audiences to interventions. Literature has proven that information dissemination alone or training only, are ineffective implementation methods. (22) Graham et al. (4) developed a conceptual framework termed, the knowledge-to-action process, with one of the phases being problem identification. More attention should be given to facilitate the ability of target audiences to identify problems that should be addressed with evidence-based practices. This could result in target audiences being more involved in the development of interventions and implementation processes leading to positive perceptions towards practice change and improved overall adherence to interventions.

Practice change starts with individual behavioural change. (3) Common measures of individual change include the individual's knowledge and beliefs toward changing behaviour and their self-efficacy to make the change. (3,117) Many different bodies of theories for changing behaviour exist. (117) Furthermore, various frameworks have included these theories to guide implementation processes. (3) Grol et al. (117) report that the choice of quality-improvement strategies within implementation processes is dependent on the theoretical assumptions used. Due to the complexity of practice change it might be necessary for change agents to collaborate with implementation scientists, health policy makers and managers to effectively change practice within specific contexts.

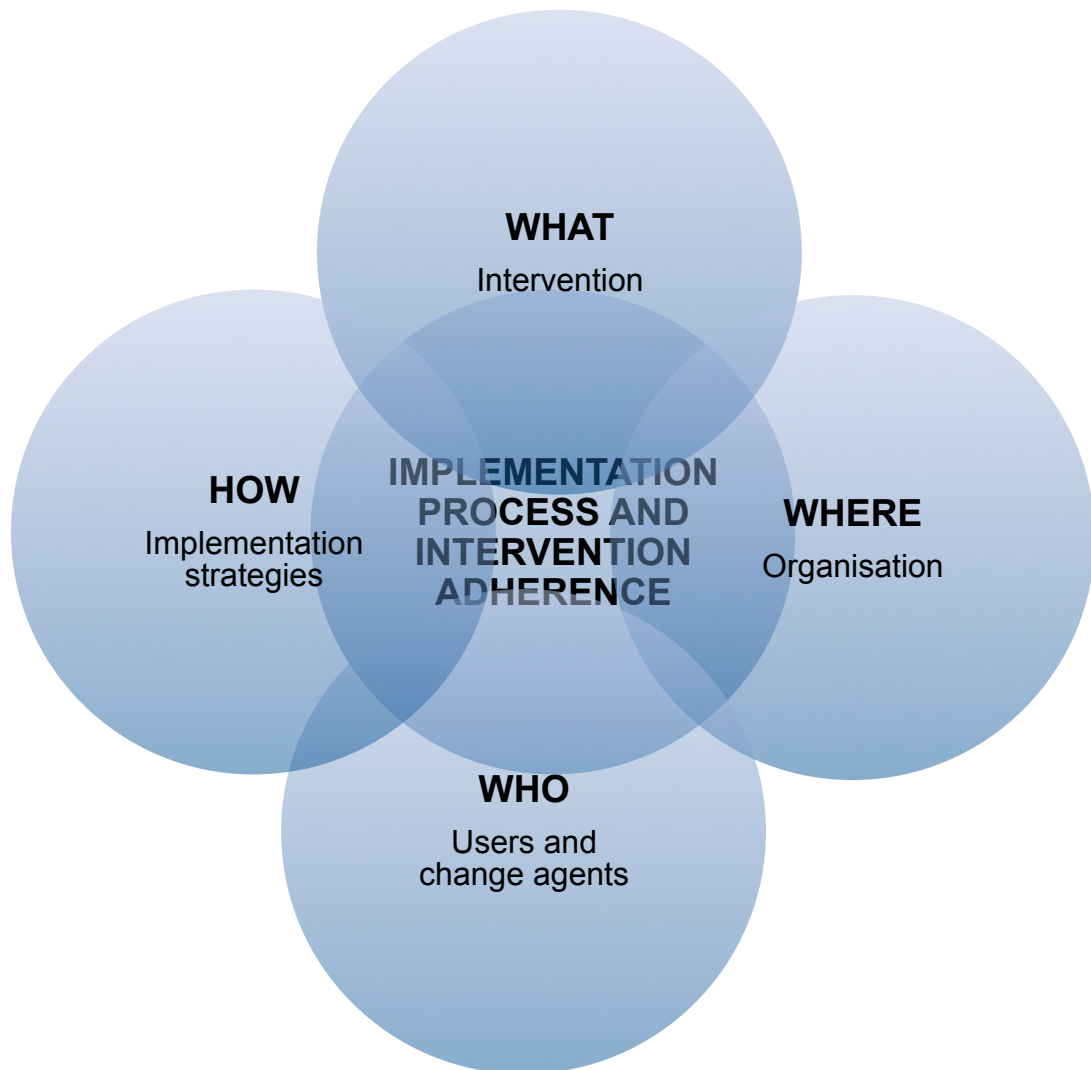


Figure 4.1: The What, Where, Who, How (WWWH) model

4.2 RECOMMENDATIONS FOR FUTURE RESEARCH

Implementation science still requires additional development. Literature has not yet identified appropriate strategies and frameworks to ensure effective quality improvement in all circumstances. (20) Special attention should be given to implementation strategies to ensure the long-term sustainability of implementations.

Implementation should be an iterative process and driven by local opinion leaders and champions. A further field to explore is the effect of these local opinion leaders and champions on the sustainability of evidence-based practice post-implementation in ICU. The perception of the change agents, opinion leaders and champions regarding implementation processes may also be valuable to explore.

Research should focus on developing strategies to facilitate the ability of target audiences to identify problems that should be addressed with evidence-based practices and measure team interaction. Moreover, the development of objective measurements for self-efficacy, team interaction and satisfaction of the target audience regarding implementations may be beneficial to facilitate sustainability.

The use of the WWWH model as a tool to assess barriers and/or the evaluation of the reflections of target audiences regarding implementation processes can be further explored.

Further research is necessary to identify which strategies are most effective in overcoming certain barriers. Future research also needs to investigate what barriers must be overcome before commencing with the training strategies.

4.3 LIMITATIONS

4.3.1 Scoping review

Two limitations were identified in the scoping review, namely:

- At least three papers were excluded in the scoping review due to language; however, it is unknown how many more papers were excluded due to language, because papers were filtered for language if the databases so allowed. This is seen as a limitation, because information in these papers may have contributed to the results of the scoping review.
- A number of databases were searched. No hand searching was included due to its unreliability. This is considered a minor limitation, because from our results we have noted implementation processes are context-specific.

4.3.2 Primary study

The following limitations were identified in the primary study:

- Bias of the primary investigator (PI) during data collection and analysis may have affected the results of the study. This is considered a minor limitation because multiple efforts were made to limit bias, including bias declaration of the PI, follow-up interviews with participants for clarity on statements, member checking and the use of verbatim quotes in the results.

- The results of Chapter 3 cannot be generalised to other populations with the same degree of certainty that the results of a quantitative study can, because qualitative findings are not tested to determine whether they are statistically significant or due to chance. (118) Furthermore, no attempt was made to assign frequencies to the linguistic features that were identified in the data because of the qualitative nature of this study. This implies that rare phenomena received the same amount of attention as more frequent phenomena. (118) It is therefore recommended to use a mixed methods methodology in such studies to quantify the results and to provide a more comprehensive conclusion on the study findings.

4.4 STRENGTHS

4.4.1 Scoping review

- Only included papers reporting the qualitative data analysis methods used in their respective studies were included to determine the factors affecting the perceptions of ICU staff regarding implementation processes. We argued that papers with a clear data analysis method would add credibility to our results.
- Results of the included studies were only included in the review if the data analysis methods were reported.

4.4.2 Primary study

From the primary study, the following strengths were identified:

- The PI was not involved in the implementation process of the protocol apart from gathering the perceptions of the physiotherapists regarding the implementation process. As a result, the PI did not influence the perceptions of the physiotherapists, which could have influenced or skewed the collected data.
- Follow-up interviews were conducted with all participants to ensure clarity on statements made in the previous interviews and to limit assumptions made by the PI during data analysis.
- Peer review of the study process, the transcripts and analysis of the interviews by a third party ensured the credibility and dependability,

auditability and confirmability of the data.

4.5 OVERALL CONCLUSION

The intervention being implemented, the structure and culture of the organisation, the characteristics of the individuals involved in the implementation and the characteristics of the implementation process, all affect the perception of staff regarding implementation processes. Yet, the factors affecting the perception of staff regarding implementation processes differ between implementations and context. Implementations should therefore include barrier assessments and evaluations using the perceptions of the target audience, which can be guided by the WWWH model. Implementations should preferably be iterative, internally driven processes with all relevant disciplines involved in the development of the interventions and implementation processes. The challenge remains to effectively change the behaviour of the target audience to ensure that the implementation of a protocol will be sustainable. Future studies should focus on facilitating problem identification of the target audience and team interaction as well as the development of objective tools to measure self-efficacy, team interaction and satisfaction of the target audience regarding implementation processes.

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METHODOLOGY-RELATED ADDENDA

ADDENDUM A: SEARCH STRATEGY – DATABASES SEARCHED

CINAHL

Basic search

Limits applied to database:

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement" OR "Organizational Innovation" OR "Practice Change" OR "Knowledge Translation" OR "Guideline Adherence" OR Protocol* OR Guideline* OR Implement*) AND (Process* OR Procedure*)	55
Total	55

MEDLINE via EBSCOhost

Basic search

Limits applied to database:

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement" OR "Organizational Innovation" OR "Practice Change" OR "Knowledge Translation" OR "Guideline Adherence" OR Protocol* OR Guideline* OR Implement*) AND (Process* OR Procedure*)	138
Total	138

MEDLINE via ProQuest

Limits applied to database:

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement" OR "Organizational Innovation" OR "Practice Change" OR "Knowledge Translation" OR "Guideline Adherence" OR Protocol* OR Guideline* OR Implement*) AND (Process* OR Procedure*)	154
Total	154

Science Direct

Limits applied to database:

Advanced search

Searches in abstract, title and keywords

Search Terms	Hits
1. (Staff OR Clinician OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception OR Perspective)	9
2. #1 AND "Quality Improvement"	0
3. #1 AND "Organizational Innovation"	0
4. #1 AND "Practice Change"	0
5. #1 AND "Knowledge Translation"	0
6. #1 AND "Guideline Adherence"	0
7. #1 AND Protocol	1
8. #1 AND Guideline	1
9. #1 AND Implement*	3
10. #1 AND Process	2
11. #1 AND Procedure	1
Total	17

Scopus

Limits applied to database:

Searches in abstract, title and keywords

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement" OR "Organizational Innovation" OR "Practice Change" OR "Knowledge Translation" OR "Guideline Adherence" OR Protocol* OR Guideline* OR Implement*) AND (Process* OR Procedure*)	192
Total	192

PubMed

Limits applied to database:

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel"[Mesh]) AND ("Critical Care"[Mesh] OR "Intensive Care Units"[Mesh] OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement"[Mesh] OR "Organizational Innovation"[Mesh] OR "Practice Change" OR "Translational Medical Research"[Mesh] OR "Guideline Adherence"[Mesh] OR Protocol* OR Guideline* OR Implement*) AND "Organization and Administration"[Mesh]	152
Total	152

Web of Science

Limits applied to database:

Searches in topics from all databases

Language: English

Search Terms	Hits
(Staff OR Clinician* OR "Health Personnel") AND ("Critical Care" OR "Intensive Care Unit" OR ICU) AND (Perception* OR Perspective*) AND ("Quality Improvement" OR "Organizational Innovation" OR "Practice Change" OR "Knowledge Translation" OR "Guideline Adherence" OR Protocol* OR Guideline* OR Implement*) AND (Process* OR Procedure*)	154
Total	154

ADDENDUM B: DUPLICATE ELIMINATION

Database	Total Hits	Total hits after duplicate elimination
CINAHL	55	375
MEDLINE via EBSCOhost	138	
MEDLINE via ProQuest	154	
Science Direct	17	
Scopus	192	
Pubmed	152	
Web of Science	154	
Total	862	

ADDENDUM C: ETHICAL APPROVAL



Approved with Stipulations New Application

14-Jun-2016
Maritz, Jacques JJ

Ethics Reference #: S16/05/091

Title: Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists' perspectives

Dear Mr. Jacques Maritz,

The New Application received on 11-May-2016, was reviewed by members of Health Research Ethics Committee 1 via Expedited review procedures on 08-Jun-2016.

Please note the following information about your approved research protocol:

Protocol Approval Period: 14-Jun-2016 - 13-Jun-2017

The Stipulations of your ethics approval are as follows:

Reconsider allocating less of your budget to own transport and more to reimburse participants. Please refer to current guidelines from DOH re participant reimbursement which considers R150 / visit/participant fair.

Please remember to use your protocol number (S16/05/091) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).



UNIVERSITEIT STELLENBOSCH UNIVERSITY
UNIVERSITY OF STellenbosch

Ethics Letter

13-Jun-2017

Ethics Reference No: S16/05/091

Title: Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists' perspectives

Dear Mr J Maritz

Your request for extension/annual renewal of ethics approval dated 21 April 2017 refers

The Health Research Ethics Committee reviewed and approved the annual progress report you submitted through an expedited review process.

Your approval of the research project is extended for a further year.

Approval date: 14 June 2017

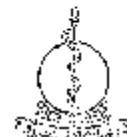
Expiry date: 13 June 2018

Yours sincerely,

Olivia Richard
HREC Coordinator
Health Research Ethics Committee 1



Faculteit Geneeskunde en Gesondheidswetenskappe
Faculty of Medicine and Health Sciences



Alles vir Nasering van die Mediese Stene • Research Days 2017 and Support the plan

Postbus/PO Box 241 • Cape Town 7800 • Suid-Afrika/South Africa
Tel: +27 (0) 21 958 5677

ADDENDUM D: INSTITUTIONAL APPROVAL



TYGERBERG HOSPITAL
REFERENCE: Research Projects
ENQUIRIES: Dr GG Marinus
TELEPHONE: 021 938 5752

Ethics Reference: S16/05/091


TITLE: Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists' perspective.

Dear Mr J Maritz

PERMISSION TO CONDUCT YOUR RESEARCH AT TYGERBERG HOSPITAL

1. In accordance with the Provincial Research Policy and Tygerberg Hospital Notice No 40/2009, permission is hereby granted for you to conduct the above-mentioned research here at Tygerberg Hospital.
2. Researchers, in accessing Provincial health facilities, are expressing consent to provide the Department with an electronic copy of the final feedback within six months of completion of research. This can be submitted to the Provincial Research Co-Ordinator (Health.Research@westerncape.gov.za).


DR GG MARINUS
MANAGER: MEDICAL SERVICES [RESEARCH CO-ORDINATOR]



DR D ERASMUS
CHIEF EXECUTIVE OFFICE
Date: 13 July 2016

TYGERBERG HOSPITAL

Ethics Reference: S16/05/091

TITLE: Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists' perspective.

BY


An authorized representative of Tygerberg Hospital

NAME Dr DS Erasmus

TITLE CEO

DATE 13 July 2016

ADDENDUM E: PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT:

“Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists’ perspectives”

REFERENCE NUMBER: S16/05/091

PRINCIPAL INVESTIGATOR: Mr Jacques Maritz

ADDRESS: University of Stellenbosch

Physiotherapy Department

Tygerberg Campus, Medical School

Tygerberg

Parow

CONTACT NUMBER: 076 221 2880

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the study staff any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied, that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki 2013, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

The purpose of this study is to conduct a qualitative enquiry to understand and describe your perceptions and experiences of the implementation process of the

physiotherapy protocol in the surgical ICU. This study aims is to describe, from your perspective, how the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients is experienced and what factors affects your adherence to the protocol.

The study will be conducted at Tygerberg Hospital (TBH) in Parow, in the physiotherapy department. The study involves being interviewed or asked several questions by the researcher. The interviews will be recorded and an interviewer will take notes. We may contact you after the interviews to check that we have all the correct information.

The information obtained will be kept strictly confidential and any research papers published will not directly identify information provided by you.

Why have you been invited to participate?

You were asked and invited to participate in the study as you have participated in the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients.

What is the role of the interviewer?

Even though the interviewer is also a physiotherapist, his role will strictly be to explore and discuss your perspective regarding the implementation process of the physiotherapy protocol in the surgical ICU. He is independent of the surgical ICU validated evidence-based physiotherapy protocol implementation.

What will your responsibilities be?

The researcher will require you to sign the consent form and complete a data collection sheet to establish your demographical data prior to initiation of the interview. You will be expected to participate in individual audio-recorded interviews of approximately 30 minutes - 45 minutes. During the interview we will discuss your perception and experience regarding the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients, if you are adhering to it and what would or could improve the implementation process. An opportunity for a second interview will be arranged if required.

The interviewer will contact you telephonically after he has analysed the information collected (This will occur sometime in September – October 2016). This will be to organise a contact session in order to check that the interviewer's understanding and interpretation of what you have said in the interviews is correct.

Will you benefit from taking part in this research?

There is no personal benefit for participating in this research study. The results of this study could result in an improved understanding into protocol adherence and

highlight areas for improvement in the implementation process to effectively and efficiently change practice.

Are there any risks involved in your taking part in this research?

There are no risks associated in taking part in this research.

Who will have access to your medical records?

Not applicable.

What will happen in the unlikely event of some form injury occurring as a direct result of your taking part in this research study?

It is unlikely that you will suffer injury by participating in the interviews, however should you feel the need to talk more about your experiences, you are encouraged to contact the primary researcher as he will guide you to the appropriate resources.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to encourage you to take part in the study. However, should you take part in the study, you will be given a voucher in order to reimburse you for your time and inconvenience for the information checking session. Light meal costs will be covered for each study visit. There should be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact the primary researcher at 076 221 2880 or the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed. You will receive a copy of this information and consent form for your own records. Any changes to the study process in the course of the study will be communicated to you.

Declaration by participant

By signing below, I agree to take part in a research study entitled: "Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists' perspectives"

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.

- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) on (*date*)
2016.

.....
Signature of participant

.....
Signature of witness

Declaration by investigator

I (*name*) declare that:

- I explained the information in this document to
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did not use an interpreter.

Signed at (*place*) on (*date*)
2016.

.....
Signature of investigator

.....
Signature of witness

ADDENDUM G: PARTICIPATION ACCEPTANCE SHEET

Please circle the box of your choice:

Are you willing to participate in a research project titled: “Perception of the implementation process of a physiotherapy protocol in a surgical ICU: The physiotherapists’ perspectives”?

Yes	No
-----	----

If you indicated “yes” please complete the below required information. The primary researcher will use the below required information to arrange a convenient date and time for an interview with you.

Name: _____

Contact number: _____

ADDENDUM H: INVITATION NOTICE

**Perception of the implementation
process of a physiotherapy protocol in a
surgical ICU: The physiotherapists'
perspectives**

**If you have not attended an introductory session of this study
please read the participant information leaflet and consent
form provided.**

Contact me if you are interested to participate

Closing date: Friday, 16 September 2016

ADDENDUM I: DISCUSSION SCHEDULE

Interview Discussion schedule for Physiotherapists

Brief introduction

Now that you understand the study I'd like to know your perception on the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients.

Implementation process

What was done to implement this protocol?

Possible follow up questions:

To what extent did you participate and interact as an individual in the implementation process?

What encouraged/prevented you from taking part in the implementation process?

Are there any changes you would recommend to how it was implemented?

Educational method consensus

Do you think that the strategies you as a group agreed on was sufficient in preparing you to use the protocol in the ICU? If not, why and what change is needed.

Educational strategies (workshops; educational handbook; grand rounds; reminder pocket cards; posters)

Which of the implementation strategies did you find most / least valuable? Motivate.

Factors affecting perception of the implementation process

What is your perception of the implementation process? Was it sufficient?

What factors affects your perception of the implementation process?

Real world implementation

Are you currently using the protocol? Elaborate

Possible follow up questions:

What encourages/prevents (factors affect) you from adhering to the protocol?

Individual/social, protocol, organisational, implementation process

Are there any changes you would recommend to improve protocol adherence?

Have/will this protocol assist in your management of ICU patients?

How user-friendly is the protocol?

Do you believe this protocol can be sustained in the surgical ICU? Why? How? What is necessary or need to change for the protocol to be sustained?

Are there structures/systems/processes in place that have been setup within the department to facilitate the use of a protocol and what are they? (Wide any area and then specific to use in ICU, newly implemented or existing)

If nothing: what do you think is required to assist the use of the protocol. (Input from individual, department and higher)

Conclusion

In conclusion I would like to take you back to the overall study for your general comments. In terms of the original question: What is the perception of the physiotherapists regarding the implementation process of the validated evidence-based physiotherapy protocol for the management of surgical ICU patients and what factors influences adherence to this protocol?

Is there anything that was not covered that they want to speak about and share regarding this?

Do you have anything to add that may be useful for us to know?

Do you have any questions for me?

RESULTS-RELATED ADDENDA

ADDENDUM J: TRANSLATED NON-ENGLISH QUOTES

Theme	Sub-theme	Quotes
The nominal group technique	Understanding of the nominal group technique	<p>PT7: "... ons het nie geweet ons moet dit rêrig moet gaan doen nie... Ek dink as ons miskien net beter verstaan het, en verstaan het dat ons moet iets kies wat gaan inpas by ons huidige skedule, dan miskien dan was dit 'n bietjie beter gewees." [Translated: ... we did not know we really had to go do it... I think if we just understood better and understood that we should choose something that fits our current schedule, then, maybe then it would have been a little bit better.]</p> <p>PT9 (p.11): "... die drie wat gekies was is nie die drie waarvoor ek gestem het eintlik nie... ek was geforseer om dit te gebruik om te werk vir my." [Translated: ... the three that were chosen were not the three for which I actually voted... I was forced to use it to work for me.]</p>
	Experience of the nominal group technique	<p>PT4 (p.4): "Ek voel daar's baie herhaling gewees. Dan't dinge bietjie langer gevat. En as jy nog werk het dan voel dit altyd 'n bietjie [giggel] langer as jy gedruk is vir tyd." [Translated: I feel there was a lot of repetition. Then things took a little longer. And if you still have work then it always feels a bit [giggles] longer if you're pushed for time.]</p>
The implementation strategies	Attendance of and participation in implementation strategies	<p>PT7 (p.62): "... voor ons kon aangegaan het met om die algorithm te verstaan... [Die veranderingsagent] moet 100% buy-in hê." [Translated: ... before we could continue to understand the algorithm... [The change agent] must have 100% buy-in.]</p> <p>PT7 (p.23): "... ons het absoluut geen verhouding saam met die universiteit personeel nie... Sommige van hulle ken nie eers jou naam nie [lag]... En nou kom die universiteit en hulle sit nog 'n ekstra task op jou." [Translated: ... we have absolutely no relationship with the university staff... Some of them don't even know your name [laughs]... And now the university comes and they put another extra task on you.]</p>
	Application of strategies	<p>PT7 (p.31): "... dit is 'n intensive care, so die atmosfeer is 'n bietjie anderste. So, dis nie 'n ideale leer atmosfeer nie." [Translated: ... it is an intensive care, so the atmosphere is a bit different. So, it's not an ideal learning atmosphere.]</p> <p>PT7 (p.7): "...as [die veranderingsagent] weg is, dan was daar nie iemand ander gewees wat half gemotiveer het en daai optimisme en opgewondenheid daar gehou het nie... daar was geen key roleplayers gewees nie." [Translated: ... if [the change agent] is gone, then there was not someone else there who half motivated and kept that optimism and excitement there... there were no key roleplayers.]</p> <p>PT4 (p.21): "Maar ek dink dit sal ook goed wees as mens die hele span in dit kan kry, want ons het baie keer probleme met die verpleegsters dat hulle nie wil mobiliseer nie... mobilisasie is nie nodige-, noodwendig 'n fisioterapie ding nie. Enige iemand kan dit doen... Maar, dat almal half heeltemal ingekoop is in die idee..." [Translated: But I think it would also be good if one could get the whole team into it, because we often have trouble with the nurses that they do not want to mobilise... mobilisation is not necessary-,</p>

		necessarily a physiotherapy thing. Anyone can do it... But that everyone has half fully bought into the idea...]
The real world implementation of the protocol	The effect on the physiotherapists	PT7 (p.71): "... net om te weet dat jy het daai evidence base algorithm, gee dit vir jou daai confidence dat as iemand nou vir my gaan vra maar hoekom en waarom, dat jy vir die een kan sê dit is ge-bewys, dis evidence ge-bewys. So ek werk nie net met ondervinding nie, ek werk nie net met opinie nie." [Translated: ... just knowing that you have that evidence base algorithm, it gives you the confidence that if someone is going to ask me now but why, you can tell that one that it has been proven, it's evidence proven. So I'm not just working with experience, I'm not just working with opinion.]
	The effect on the organisation	PT9 (p.24): "Vir my, wat ek kan sien vanaf my oogpunt af, alles is dieselfde..." [Translated: For me, what I can see from my point of view, everything is the same...] PT7 (p.72): "Ja definitief. Ek voel dit is 'n meer multidisiplinêre approach." [Translated: Yes definitely. I feel it is more a multidisciplinary approach.]
The factors affecting protocol adherence	Resistance to change	PT5 (p.33): "... as ek klaar 'n attitude het teenoor [die veranderingsagent], dan gaan ek vir myself sê ek gaan dit nie toepas nie, hoekom moet ek..." [Translated: ... if I already have an attitude towards [the change agent] then I'm going to say to myself I'm not going to apply it, why must I...] PT7 (p.39): "Ek wil verander en [die veranderingsagent] moet vir my uit wys wat die voordeel gaan wees vir my, in my beroep in, en in my persoonlike en sosiale lewe as ek gaan verander." [Translated: I want to change and [the change agent] have to show me what the benefit will be for me, in my career, and in my personal and social life, if I am going to change.] PT5 (p.32): "Dit voel so iemand kom van buite af in ons daaglikse werk... en kom sê, hier is my, my tesis... ek wil dit implementeer doen dit... So 'n bietjie geforseerd, doen dit net..." [Translated: It feels like someone comes from outside in our daily work... and comes saying, here is my, my thesis... I want to implement it, do it... So a bit forced, just do it...]
	The organisation	PT9 (p.19): "... is 'n geval van wrong time, wrong place. Rêrig waar, in die ideale wêreld met die ideale ICU en die ideale span, gaan dit perfek werk." [Translated: ... is a case of wrong time, wrong place. Truly, in the ideal world with the ideal ICU and the ideal team, it will work perfectly.] PT7 (p.49): "So aan die einde van die dag is dit seker belangrik laat die manage-, management is on board... ek het nie die indruk gekry dat daar enige vlak van enforcement was van, van, van management om die protokol te volg nie..." [Translated: So at the end of the day, it is probably important that the management is on board... I did not get the impression that there was any level of enforcement, from, from, from management to follow the protocol...] PT9 (p.53): "... extension lyne miskien of meer IVACs of drip stands wat kan saam skuif met jou. Die drip stands van ons is in die bed vas, so hy gaan nie kan los kom nie. Um, miskien soos 'n rollater... Daar is niks soos daai nie..." [Translated: ... extension lines maybe or more IVACs or drip stands that can move together with you. The drip stands of us are stuck in the bed, so it cannot get loose. Um, maybe like a rollator... There's nothing like that...]

ADDENDUM K: REFLECTION ON STUDY PROCESS AND BIAS DECLARATION

The use of qualitative methods when conducting health care research is relatively uncommon but has recently been used more often to help understand health-related phenomena with the emphasis on the meanings, experiences and perspectives of the participants. (119) In health care, interviews are an appropriate method to be used for data collection if the research is concerned with interpersonal aspects of care, if the available evidence is limited, or if a small sample size is required. (119,120) Instrumentation rigor and bias management are however major challenges for researchers using qualitative methods. (121)

The primary investigator (PI) was involved in all aspects of the qualitative study, which allowed him to be completely immersed in the data and continuously reflect on the study process and data collected at multiple time points. This allowed the PI the opportunity to identify possible gaps and to ensure data saturation was reached.

The PI acted as interviewer, observer and data analyst in the study. The PI attended a qualitative research workshop to prepare him for the role. The use of a field diary allowed for the consideration, reflection and documentation of the study process and facilitated the identification of potential bias. The PI is a physiotherapist and was not involved in the implementation process of the protocol. The change agent was known to some of the physiotherapists in the target population, which according to the data affected their participation in the study. The PI was known to the target population, which may have affected the data collected from the participants, to what extent is however unknown.

During the analysis of the initial data collected assumptions had to be made regarding the meaning of many statements made by the participants. It was therefore necessary to conduct follow-up interviews. Clearing and checking the transcriptions of the initial interviews also gave the PI an opportunity to reflect on his interviewing skills. The PI identified that he should listen more attentively to what the participant was saying instead of thinking about follow-up questions. This was to avoid asking leading questions and to allow the participants to explore their thoughts.

Numerous steps were employed to ensure credibility of the data collected and of the study process. The discussion schedule of the semi-structured interviews was based on the findings of Chapter 2. The transcriptions were cleared and checked by the PI. The transcriptions and analysis of the interviews was peer reviewed by a third party. Verbatim quotes of the participants were used to support the study findings. Finally, all participants were invited to participate in member checking.

ADDENDUM L: BIOMED CENTRAL IMPLEMENTATION SCIENCE SUBMISSION GUIDELINES – SHORT REPORT (122)

Short report

Criteria

Short reports are suitable for the presentation of research that extends previously published research, including the reporting of additional controls and confirmatory results in other settings, as well as negative results. Authors must clearly acknowledge any work upon which they are building, both published and unpublished.

Short reports should be no longer than 2500 words.

Preparing your manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section.

Please note that your manuscript must include a 'Declarations' section including all of the subheadings (please see below for more information).

Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
 - "A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
 - or for non-clinical or non-research studies a description of what the article reports
- list the full names, institutional addresses and email addresses for all authors
 - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below
- indicate the corresponding author

Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the CONSORT extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used

- **Results:** the main findings
- **Conclusions:** brief summary and potential implications
- **Trial registration:** If your article reports the results of a health care intervention on human participants, it must be registered in an appropriate registry and the registration number and date of registration should be in stated in this section. If it was not registered prospectively (before enrollment of the first participant), you should include the words 'retrospectively registered'. See our [editorial policies](#) for more information on trial registration

Keywords

Three to ten keywords representing the main content of the article.

Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

Methods

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials
- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses
- the type of statistical analysis used, including a power calculation if appropriate

Results

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

Discussion

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

Conclusions

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

List of abbreviations

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations should be provided.

Declarations

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication
- Availability of data and material
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections.

If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

Ethics approval and consent to participate

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Studies involving animals must include a statement on ethics approval.

See our [editorial policies](#) for more information.

If your manuscript does not report on or involve the use of any animal or human data or tissue, please state "Not applicable" in this section.

Consent for publication

If your manuscript contains any individual person's data in any form (including individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our [consent form](#) if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

See our [editorial policies](#) for more information on consent for publication.

If your manuscript does not contain data from any individual person, please state "Not applicable" in this section.

Availability of data and materials

All manuscripts must include an 'Availability of data and materials' statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]
- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].
- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

More examples of template data availability statements, which include examples of openly available and restricted access datasets, are available [here](#).

BioMed Central also requires that authors cite any publicly available data on which the conclusions of the paper rely in the manuscript. Data citations should include a persistent identifier (such as a DOI) and should ideally be included in the reference list. Citations of datasets, when they appear in the reference list, should include the

minimum information recommended by DataCite and follow journal style. Dataset identifiers including DOIs should be expressed as full URLs. For example:

Hao Z, AghaKouchak A, Nakhjiri N, Farahmand A. Global integrated drought monitoring and prediction system (GIDMaPS) data sets. figshare. 2014. <http://dx.doi.org/10.6084/m9.figshare.853801>

With the corresponding text in the Availability of data and materials statement:

The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].^[Reference number]

Competing interests

All financial and non-financial competing interests must be declared in this section.

See our [editorial policies](#) for a full explanation of competing interests. If you are unsure whether you or any of your co-authors have a competing interest please contact the editorial office.

Please use the authors initials to refer to each author's competing interests in this section.

If you do not have any competing interests, please state "The authors declare that they have no competing interests" in this section.

Funding

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Dataset with persistent identifier

Zheng L-Y, Guo X-S, He B, Sun L-J, Peng Y, Dong S-S, et al. Genome data from sweet and grain sorghum (*Sorghum bicolor*). GigaScience Database. 2011. <http://dx.doi.org/10.5524/100012>.

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The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the CONSORT extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
- **Results:** the main findings
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Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

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The methods section should include:

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- Consent for publication

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